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NEB on show at Hanover

THE National Enterprise Board is to take a stand at Hanover Fair next month in order to initiate a visible presence on the Continent. Inmos, Insac, and Nexos are all expected to take part, together with Nexos' associate company Logica VTS and prospective associate Muirhead.

Logica will probably have several VTS 100 stand-alone word processors on show.

PETRITZ . . . back on target.

Inmos jumps queue in US

A LUCKY chance to jump the queue for semiconductor production equipment has been snatched by Inmos in the US. This should enable plans for the RAM production line in Colorado Springs to get back on schedule, says managing director Dick Petritz.

The chance came when another manufacturer cancelled an order for production equipment. Inmos promptly stepped in to take over and thus gained a much higher place in the long delivery queue.

Petritz admitted that the company's schedule for starting production of 64K bit RAMs in the US was beginning to slip. It was planned to start manufacture of the parts at Colorado Springs early in 1980 and Petritz now says that Inmos is back on target. The first test wafers should be processed by August.

The man in charge of the operation is another new recruit to Inmos, Ralph Bohannon, ex front end process manager with Texas Instruments.

NEWS IN BRIEF

GA sets up $5m micro plant

MINICOMPUTER manufacturer General Automation is to spend $5 million setting up a new microelectronics production facility in the US. The 50,000 square foot plant will employ 200 people by 1982, and will manufacture devices both for internal needs and other customers.

Its main product is likely to be a 32-bit microprocessor, together with a range of peripheral devices. The move comes following the withdrawal of GA's interest in the US semiconductor company, Synertek.

P-E to buy Etec

ONE of the leading suppliers of capital equipment to the semiconductor industry, Perkin-Elmer, is to acquire the Etec Corp of Hayward, California, a manufacturer of electron beam exposure systems.

Performance boost

IBM 370/145 users running VS1 can now boost its performance by between 10 and 15% using Microfast/VS1 Assist, a microcode based product from Itel. Microfast is said to be functionally equivalent to the VS1 Assist portion of IBM's own ECPS for 148 users and it resides in the main CPU memory of the 145 beyond the microcode supplied by IBM.

Alternatives

UNIVAC users are being offered plug compatible alternatives to Univac's own peripherals by Memorex which can now supply replacements for the Univac 8430, 8433, 8440 and 8460 disc drives, the Univac Fastrand II drum and the Univac Uniservo 16, 20 and 30 tape systems.

2950s for Volvo

ICL is supplying two 2950s worth £1 million to Volvo Concessionaires Ltd of High Wycombe, Bucks, part of the Lex Service Group.

CPP's European network acquired by US firm

TO give it closer control over what has become a significant part of its business, the US software house Applied Data Research is to buy all five of the software product marketing and support companies set up in Europe by its long-time agent, Computer Program Products.

The deal, which eventually could be worth as much as £500,000, will give ADR full control of the CPP operating companies in Germany, Holland, Belgium, Austria and Switzerland — a total of seven offices in all.

These will begin trading under the ADR name from May 1, the formal transfer of ownership being completed as soon as possible afterwards. The final amount to be paid will depend in part on future trading results.

CPP's UK business will not be affected by the takeover, and it will continue to sell ADR products under licence in this country. The firm, part of the CAP-CPP group, also plans to re-establish offices in most of the countries concerned.

These new companies will market not only the Boole and Babbage range of performance monitoring software but also the growing range of CPP's own products, such as the Pecs and Improve packages it acquired last year (Software File, December 14, 1978). They will trade under the CPP name.

ADR's move is undoubtedly prompted by the success of CPP over the ten years it has been handling the ADR product line. CPP sales currently account for around 50% of ADR business outside the US, giving it some 25% of all ADR business worldwide.

Last year, CPP earned about £2.6 million in the UK and Europe, most of it from ADR product sales. A spokesman for the firm estimated the European content at about 55%, equivalent to between £1.5 and £1.6 million.

Total ADR turnover last year was just in excess of £10 million.

Another factor influencing the move is the strategic importance attached by ADR to the Datacom DBMS family that it acquired last year (Software File, September 28, 1978).

ADR has already set up a subsidiary in Germany — ADR Datacom GmbH — specifically to market this software and is likely now to market it elsewhere in Europe with the exception of the UK.

Continuity of support for current CPP customers is an intrinsic part of the new agreement, which provides for assistance from the CPP technical centre at Richmond for as long as necessary.

ADR is also likely to benefit from the continued service of some CPP staff, all of whom will be given the option of staying with the companies after the takeover. Most CPP personnel have specialised either in the Boole and Babbage or the ADR product range, and the latter would be likely to find it attractive to stay with ADR.

Although the NEB has an interest in CPP through its 30% holding in CAP, no formal agreement to the sale appears to have been sought by CAP.

● ADR's acquisitions in Western Europe follow swiftly on news of a significant breakthrough by the company in the Eastern bloc, with sales to both Russia and Bulgaria. See Software File, page 10.

India relaxes rules on import of software

RULES governing the import of software into India have been relaxed as the result of recommendations by an EEC delegation that visited the republic last year. This encouraging development greeted this year's delegation when it arrived in India last week, and there is considerable scope for more software co-operation with Common Market countries.

There are also plans for the enhancement of large government installations to enable advanced operating software to be used.

Several members of the EEC delegation are close to completion of agreements for collaboration with Indian companies, on contracts in Europe and in third countries. There are also prospects of sales to Indian organisations.

Hardware collaboration is less promising, but some delegation members have been looking at the possibility of manufacturing systems in India for sale locally and abroad. However, such projects are likely to take about three years to get off the ground.

An example of this is ICL's plan to build 2904s. A production licence was sought over two years ago but this has still not been granted, and the EEC group was given the impression that to expect a licence to be granted a month after a renewed application was to ask for paradise.

Nixdorf plans remote diagnostics

PLANS for a diagnostic centre linked to customer sites which will automatically sense hardware faults, have been announced by Nixdorf in Germany.

Nixdorf, whose field engineering division employs 2,300 staff, hopes to pay for the project by reducing the number of personnel in field support.

While automatic error signalling is not new, the idea of one central computer monitoring others is said to be unique. A remote diagnostic centre will not only continually survey the customer computer and notify a service technician if necessary, but will also itself provide preventative maintenance before a breakdown occurs.

The system will not be available in the UK for another three years.

First 1 Mbit bubble memory

THE first 1 Mbit bubble memory is likely to come from Bell Laboratories, following an extensive development effort led by co-inventor of the technology, Andrew Bobeck. Work at Bell has led to a reduction in device sizes to a third of present size and a data rate that is 10 times faster.

Bobeck sees bubble memories being used for telecommunications, and Bell Labs is already working on some applications.

ICL still fighting insurers over 2960

MORE than three months after paying ICL about £1.4 million for a completely new dual 2960 system for the Swiss Bank, the bank's insurers have still not managed to get ICL to agree on a satisfactory method of disposing of the smoke-contaminated 2960s that the new system replaced.

The contamination was caused by a fire in the air-conditioning at the Swiss Bank's computer centre not long after the 2960s were installed. It was said that it could have serious long-term effects, and considered the machines to be complete write-offs. However, experts brought in by the insurers said that the machines could easily be reclaimed.

The loss adjusters acting for the insurers are not prepared to comment on the case at the moment. The main question appears to be whether ICL would be prepared to co-operate with a third party maintenance company that could service the machines after they had been cleaned and sold to a new user.

The contaminated 2960s are still at ICL's West Gorton factory where they were taken after the fire, and ICL would only say that it was still talking to the insurers about "disposing of them".

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Unions split in Civil Service pay talks

AS Civil Servants staged a one-day national stoppage and increased selective strike action this week, inter-union bitterness broke out following a meeting between five of the eight Civil Service unions and Roy Hattersley, the Minister presently charged with national pay negotiations.

Ken Thomas and Gerry Gillman, general secretaries of the Civil and Public Servants Association and the Society of Civil and Public Servants respectively, claim they were not informed of the meeting.

This has now resulted in the CPSA and SCPS breaking away from the other five unions and a meeting is to be held today (Thursday) to discuss the situation.

"We think that the action of the five unions is intolerable," commented a CPSA spokesman.

The five unions which met Hattersley, were the Inland Revenue Staff Federation, the Civil Service Union, the Prison Officers Association, the Institute of Professional Civil Servants, and the Association of Government Supervisors and Radio Officers. One other, the First Division Association, was unable to attend.

"We saw the 9% offer as a marked improvement, but one we would not accept without modification," Tony Christopher general secretary of the IRSF told Computer Weekly. "It would have to provide more for the lower paid. I hope that the CPSA and SCPS will think about what they intend to do because breaking off from the other unions can only help the

● Turn to page 2

Briefing

Rolls Royce deal for Amdahl

AMDAHL is understood to have pulled off another major sales coup in the UK with a contract from Rolls-Royce for a 12 Megabyte 470 V/7. The Amdahl machine was chosen in preference to an IBM 3033 and will run alongside an existing 3033 at Derby. Neither Amdahl nor Rolls was prepared to comment on the deal.

Last year Amdahl won a £7 million order from British Airways for kit that included two V/7s and two V/6s (CW, October 5, 1978).

Times progress

PROGRESS has been good in management-union talks at The Times, except for those involving Natsopa, which continue to be sticky (CW, March 22). A solution to the major problem of direct input by journalists appears close. Issues unresolved by Saturday, April 7, will be referred to ACAS for non-binding conciliation.

One-day strike

OBJECTING to a plan by the Chemical Society to relocate about 70 staff to Nottingham, where it intends to set up an in-house computer typesetting system, members of the Association of Scientific, Technical and Managerial Staff held a one-day stoppage last week.

First client

FIRST customer for the Cray 1 supercomputer bureau service introduced late last year by London United Computing Systems (CW, November 23, 1978), is the London office of Electrowatt, an international engineering consultancy based in Zurich. The Cray 1 is located in the US at the LUCS parent, United Computing Systems in Kansas City.

Scots expansion

ICL has announced that it is recruiting a "substantial" number of graduates over the next few months as part of a major expansion of its Scottish Development Centre at Dalkeith, Midlothian. Microprocessor software for applications like remote engineering diagnostics will be one of the most important new development areas.

Mini Wordplex

A COMPACT version of the Wordplex 1 word processor, using mini floppy discs and eliminating the disc pedestal, has been introduced. Called Wordplex 2, the tabletop system houses the discs alongside the screen in the same case; it is functionally the same as Wordplex 1.

Research centre

RESEARCH and development ... to be set up in the UK by ... A formal announcement is likely to be made soon and will probably involve the transfer of some of the company's software development activity from the US to the UK.

Tories plan Minister for Information

AS the election campaigns start rolling, the only party that looks set to deal with computer issues on the hustings is the Conservatives. The working group set up at the request of Sir Keith Joseph and chaired by Ian Lloyd, MP for Havant (CW, June 1, 1978) has hurriedly completed its proposed "Policy for information technology" and this will probably form the basis for party policy in this field.

Principal among the report's many recommendations is one to appoint a junior Minister for Information Technology within the Department of Industry. He would have responsibility for the "information industries" — the Post Office, the media, computers and electronics, and the Central Computer Agency (currently part of the Civil Service Department).

The Minister would be charged with "creating an industrial climate in which information technology flourished". The idea of a new separate Ministry was rejected, as experience with the abortive Ministry of Technology and Department of Economic Affairs had shown that too much confusion of responsibility resulted.

In departments responsible for "social consequences", such as Employment, Education, and the Home Office, the report says, "Greater awareness can and must be achieved without changes in the Ministerial structure".

The report is emphatic that to promote prosperity new industries must be nurtured and old ones must run down. To increase mobility of staff it is pro-

● Turn to page 14

Lloyd . . . report does not commit the front bench.

They're off — in DP sports

COMPUTASTARS 79 gets under way on Sunday with the first regional heat at the New Alexander Stadium, Birmingham. There will be 29 teams — 18 men and 11 women — competing for a place in the Crystal Palace finals in September.

When the lists closed over 230 teams had entered Computastars, the only athletic competition for computer people. The entry is well spread throughout the country with 37 teams in the North East heat; 32 in the North West; 20 in the South West; 19, East Anglia; 50 Thames North; and 42 Thames South.

Reports and pictures of each heat will be carried in Computer Weekly, which is jointly sponsoring Computastars with Wright Air Conditioning.

First 2950 user to run under VME/K

THE first ICL 2950 user to run under VME/K is the London-based Medical Sickness Group. MSG has decided to go for the 2950 native mode operating system rather than emulate the 1900 environment under DME because it is converting its existing George II batch operation to an integrated database management system using IDMS with teleprocessing.

MSG is running Release KSV 14 of VME/K at the moment, but plans to convert to Release KSV 17 when that is available. KSV 17 is what ICL refers to as "Son of K" and it is expected to occupy far less main memory space than all previous versions — about 400K bytes instead of 750K.

With its troubled history only four ICL users are understood to be running VME/K at the moment, all of them with 2960s.

MSG plans to offer VME/K development services to other 2950 users and will run VME/K on the 2950 during the day from the start. Existing software from the 1902A being replaced will be run in the evening under DME until the new database system is complete.

CPP sets up new companies

THE software product marketing group CPP is forming new companies in Belgium, Holland, and Germany, according to CPP managing director Sandy Cormack. A full recovery to formal level of business would take about 18 months to two years, he thought.

Two CPP companies in Europe totally unaffected by the ADR takeover are CPP Microsoft, working out of Holland, and CPP European Services, the European consulting and general software services operation. These will continue to trade as before.

Following the disposal of its principal operations on the Continent, CPP is facing an interesting situation with its other main software suppliers, Boole and Babbage. Details, page 7.

Rees silent over police records on MPs

THE Home Secretary, Merlyn Rees, last week refused to reveal to eight Labour MPs whether there were entries about them on the Metropolitan Police intelligence computer.

The eight backbenchers, all members of the Parliamentary Labour Party civil liberties group had tabled questions asking to see any computer entries about them in order to draw attention to their proposal to give citizens a right of access to police files.

In refusing to answer, Rees pointed to the Data Protection Committee report (CW, December 7, 1978) which recommended that there should not be a right of subject access to police intelligence files. One of the MPs, Arthur Latham (Paddington), replied angrily to Rees: "Your liberal image is now terribly tarnished."

Another of the backbenchers, Chris Price (Lewisham W) told Computer Weekly that they had hoped to amend Clement Freud's Freedom of Information Bill to cover police records, but this aim had been dashed by the dissolution of Parliament (see page 3).

CSS takeover

NATIONAL CSS, the US parent of CSS International, is being taken over by Dun and Bradstreet, the US company whose many interests include ownership of the monthly computer magazine Datamation. National CSS has a turnover running at more than $90 million.

COMPUTER WEEKLY'S INSIDE NEWS

GROWING APACE

THE real time minicomputer market continues to grow at a rate of 20-30% a year — twice that of the rest of the industry. Fred Lamond looks at the contenders in the various areas and considers their prospects in the overview of this week's 7-page minicomputer supplement. Pages 21/27

RUSSIAN THREAT

While the Americans ponder the real threat to their dominance of the world microelectronics market ... the race. A recent report shows that Russia is not as far behind in this technology as many people supposed. Page 12

INTO THE FUTURE

We take another look at possible worlds to come this week with the latest of our Futureview ... Pages 18/19

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COMPUTERVIEW

Priority for the next government

THURSDAY, May 3 could mark a turning-point in the current industrial strategy of providing hefty backing for the wave of new technologies battering the UK shore.

As Inmos, Nexos and Insac gather momentum and increase activity, any withdrawal of support for these ventures would be putting the long-term future of many parts of UK industry at risk. At this tender stage it would also be wrong to consider selling the National Enterprise Board interest in these bodies, as has been suggested by Sir Keith Joseph (CW, April 27, 1978).

The current initiative in terms of the micro application project and the wide-ranging commitment to computer education and training in schools, colleges and elsewhere, must be maintained whichever party is in power. These matters should not be allowed to enter the political arena during the General Election. Information technology is too important to the survival of British industry to be subjected to political manoeuvring.

Another issue which those seeking our votes must consider is that of our role in Europe and the place of our industrial strategy in a European context.

Speaking at the Future of World Electronics conference (CW, March 29, 1979) Viscount Davignon, of the EEC, pointed out that "a vigorous industrial strategy at the European level is necessary to ensure that Europe does not miss the 'telematique' (combination of computers and telecommunications) train."

He called for the setting of bold objectives, beyond the reach of individual states but within reach of the Community, to supply a third of the world market for electronic products by 1990 and establish a powerful telematique infrastructure as a base for an entire economy.

He proposed several European-level programmes including the use of satellites, the creation of common standards, and priority research and development programmes. He drew attention to the acute shortage of skills at every level, despite the highest European levels of unemployment for 40 years, and advocated an immense effort of education and training to relieve this critical bottleneck.

Last week two working party reports published by the National Economic Development Council echoed the thoughts of Davignon on industrial strategy at the UK level (see page 3).

What is clear from these reports is that if UK industry is generally slow in adopting microelectronics, then it will lack a firm home market for new products and will miss out on export opportunities as well as being more vulnerable at home to overseas competitors.

These new opportunities and sources of competition presented by the micro are recognised, as are the high product development and marketing costs with intense international competition in many product sectors.

Both reports draw attention to the "shortages of a wide range of skills, particularly design engineers, sales engineers, programmers . . ." where unfilled vacancies can amount to 30% of total need, pointing out that "the general shortage of systems analysts and programmers . . . will hinder the overall pace of incorporating electronic techniques in UK-produced office machines".

The UK working parties are aware of the problems and challenges; so are other EEC member countries; the Commission is itself acutely aware. This is probably the EEC's biggest and perhaps last chance to act as one, with common interests and objectives.

We stand at the crossroads, facing international opportunities and threats. The next government's job must be to give top priority to ensure the UK's speedy, effective and "human" application of the new technologies both as a nation and as a member of the EEC.

FOCUS

A realistic look at the office through the ages

ACCORDING to a recent news item, this month's Hannover Fair will feature four realistically presented office scenes dated 1910, 1930, 1960 and 1979. This will be a combined presentation by all the office and data technology exhibitors.

Any computing company involved may well find its role in the project very much that of an interested observer standing on the periphery. That so little computing took place in the office pre-1960 may surprise the organisers, but it is a matter of record that both major UK industry chronicles, Computer Weekly and the Computer Users' Year Book, have both recently celebrated 10 years of publication.

Pre-ten years ago, computing was still in the dark ages, more mass bulk than mass array. IBM and ICT were fighting it out for the tabulator/sorter marketplace. Punch cards dominated not only the system but every spare space in the installation.

In the 1960 era, office data processing featured file indexes and much carbon paper, plus jumbo-sized ledgers. Further back in time, the 1930 same office used mechanical calculators, but relied more on ready reckoners.

As for 1910, mechanised office routines were limited to the pencil sharpener, with word processing being in long-hand mode.

Most fascinating will be the 1979 presentation. Contrary to widespread belief, the electronic office has not yet surfaced. Will the organisers accept this fact of office life, or continue the myth? Today's typical office is most likely to be operating 1960-level calculators and adding and typing machines. The electric typewriter is in the future project/budget file. Office communications are more likely to be by way of raised voices than electronic dialling. System X will be represented by the pools syndicate.

Whether in 10 years' time, the electronic office will have arrived, remains to be seen. The odds, however, are against it. It is customary for most offices to operate several years behind the times, electronic or otherwise. Despite the lavish promotion of such worthy organisations as Plessey, Philips and Rank Xerox, it can be taken for granted that few office managers will have heard of the electronic office — let alone implemented one. Costs are obviously the major barrier. Apart from US banks, international oil companies and UK state bodies, few will be inclined to venture time and capital resources into integrated office services.

Looking into the "computa-stars," the future may well be a challenge between the plodding traditionalist and the hurdling progressive. Backing the plodders will be the trade unions and company accountant. Encouraging the progressives will be the DP manager who could well see the natural extension of his responsibilities being into the office environment.

For the DPM, data, word and text processing are fully compatible. Micro technology will enable the office to become fully automated and fully dependent on the technical expertise of the DP team.

The danger of the DPM being isolated from office automation, is apparent. A forthcoming word processing conference, for instance, has invited Eric Moonman MP to speak on the problems and benefits of introducing a WP system, rather than a DP professional.

At the same conference, the Post Office will be discussing its plans for electronic mail. Whether this will feature first and second class electronic mail, has not been revealed. In 1990 we shall, perhaps, be urged to key input early for Christmas.

1984 and all that . . . .

WHEN the media talk about computers, they often get their wires crossed in comical ways. This week's example was sent in by John Clark, of Alton, Hants, who wins £5.

Computer data sheets containing this month's salary details of thousands of Bexley Council workers disappeared when a thief stole a car outside swimming baths in Lowfield Street, Dartford. They were inside a white Ford Cortina registration KMF 572K and a council spokesman said, "Unless the computer is returned our whole salary programme will have to be reconstructed."

Evening News, London

Ten years ago...

COMPUTER WEEKLY APRIL 3, 1969

GEORGE 3, ICL's operating system for the larger ... was released ... SLAM ... 8-bit microcircuit containing 189 logic gates, on a ... square silicon chip, was developed by Dr Igor Aleksander who planned a ... 1,000 units ... The ... Stock Exchange Certificate Service went ... week, then had to ... for program bugs to be ... out ... Univac ... 1106 as an economy ... the large-scale 1108.

Unions sp...

● From front page

government of the day ... members."

As the two largest Civil Services unions, the CPSA ... SCPS have been co-ord... the main strike action ... rejected both the government offer of 7% last month ... improved offer proposed ... week of 9% with the ... paid by April 1, 1980.

Selective targets ... National Savings ... Glasgow where ... operators have ... ing the updating of ... accounts and the ... up to £1 million a day ... night investment by the ... ment.

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The Meteorological Office has a requirement for a small terminal-orientated computer system to support courses in programming, statistics and general meteorology. The system will be linked to an IBM 370/158 located 13 miles away at Bracknell and must provide remote job entry facilities to that machine. The target date for installation is 1 November 1979.

Applications for copies of the Operational Requirement quoting CEH/32 should be made to:

Central Computer Agency
Room 822
Riverwalk House, 157/161 Millbank
LONDON SW1P 4RT

Proposals must be received by 11 May 1979.

Govt should take key role in promoting electronic office industry—Neddy

THE government should take a key role in promoting the UK "electronic office" industry by co-ordinating its development and procurement and introducing standards. It should also encourage a foreign-owned multinational to set up a word processing manufacturing plant in Britain in healthy competition with Nexos.

Those are among the main recommendations in the latest progress report of the Neddy Office Equipment Sector Working Party.

The working party expresses serious concern over the UK office equipment industry's ability to compete both at home and abroad. "Imports are encroaching ominously on the home front," it says, adding, "Unless urgent solutions are found in these areas the UK sector will find it increasingly difficult to compete in world markets."

These worries are echoed by a second report published at the same time by the Automation and Instrumentation Sector Working Party, which warns that sluggishness on the part of UK manufacturers to start using microprocessors is weakening the sector's home market, and this in turn is making it harder to compete overseas.

"There are indications," the report says, "that this has already happened to a certain extent in products such as automated warehouses and industrial robots."

On the other side of the coin, the report says that development of the automation and instrumentation industry is being severely constrained by skill shortages at all levels, from graduate engineers to craftsmen and technicians, and by lack of venture capital. Additional sources of capital for smaller companies are badly needed, it says, particularly because the banks are not suitable sources for high-risk ventures.

Skill shortages are being aggravated by government incomes policy which causes anomalies in pay structures, the working party says, and recommends that the policy be made flexible enough to rectify this.

Election pledges sought by freedom of information campaigners

CAMPAIGNERS for freedom of information are pressing the political parties for election pledges to support their cause, following the death of Clement Freud's Bill (CW, January 18) brought about by the dissolution of Parliament. All the progress made by the Bill is now lost, and any further Bill will have to start the Parliamentary process again completely from scratch.

With ironic timing, the government has published its response to the Freud Bill in the form of a Green Paper setting *forward a proposal* for self-enforcing codes of practice on disclosure of information by civil servants. Also published is a detailed review of freedom of information laws in other countries.

The National Council for Civil Liberties described the Green Paper as "real rubbish," insisting that a statutory right to information is essential. The Council has published a pamphlet, "The Politics of Secrecy," which gives estimated costs of freedom of information, based on US and Canadian analyses, varying from £1.4 million to £4.24 million a year.

The NCCL hopes to find another back bencher who will put forward a similar Bill in the new Parliament. The session between May and July will probably be too short, in which case nothing could happen until the autumn.

In the Green Paper ("Open Government", Cmnd 7520) the view is put forward that Freud's proposal would fundamentally alter the principle of ministerial accountability to Parliament, which is the basis of our democracy and unlike anything in the other countries that have embarked on such laws. In those countries, the Green Paper says, experience has shown that open government is best achieved through gradual developments, not revolutionary change as Freud's Bill would entail.

There has also been much litigation in other countries, the paper points out, over such issues as whether certain papers fall within an exempt category or not, and these are often in politically contentious areas.

The Hex Kid's Adventures have been held out this week due to pressures on space.

Marcol aims for four-figure market in hotel systems

IN A move to capture an estimated four-figure market for hotel computer systems, Marcol has sold the exclusive marketing rights for Champs in Scandinavia to a Finnish company, Tieste Oy, owned by Finnish banks. This company has been formed specifically to offer a hotel systems service which can be tailored according to requirements.

First installed at the 814 room London Penta last July (CW, July 6, 1978), Champs, computerised hotel accounting and management system, is now installed in six major London hotels including The White House, owned by Rank Hotels.

In addition, Marcol maintains the THF hotel systems based on dual Digital Equipment PDP machines. These systems are likely to be replaced in the near future, and if the group opts for Champs it would give Marcol entry to what is said to be the largest hotel group in the world.

Marcol has good connections with the Holiday Inns group and hopes to sell the system to a number of US-based hotel chains such as Hilton and Inter-continental.

The original cost of Champs was £150,000 including the licence for software. The current price is £50,000 and new developments are expected to reduce the cost. Marcol is negotiating with the Department of Industry to do this work on micro-based hardware selling to 100 bedroom hotels at about £15,000.

'Consult unions on robots'

IF the UK is to make up lost ground in the use of robot technology, more open debates by management are required to bring the topic and its implications into the full view of unions and workers.

Speaking at Robots 79 at Nottingham University last week, Joe Engelberger, founder and president of the industrial robot manufacturer, Unimation, gave this advice.

Engelberger said the next decade would spawn versatile machines such as the eight-... multi-robot system under development by Unimation.

An introduction to WP

Randy Goldfield

COMPETING with the General Election on May 3 will be the start of Information Studies' two-day conference Introducing Word Processing. To be held at the Cumberland Hotel, London, the gathering will deal with the definition, implementation and management of WP, for the benefit of managers who are beginning to look at the subject.

A well-known figure on the US word processing scene, Randy Goldfield of Booz Allen & Hamilton (pictured here) will talk on "Fitting word processing into the organisation", touching on such issues as centralisation versus decentralisation, and interfacing with other parts of the company.

Goldfield is head of the New York consultancy's WP practice, where she handles feasibility and implementation planning, and often contributes to the media.

She will also be speaking at the ICFC word processing conference on May 1 and 2 (CW, March 15).

Also taking part in ISL's meeting will be Frank Jones of Bradford City Council, whose recent experience of installing a large shared-logic system while overcoming considerable union opposition (CW, March 8) should be particularly interesting.

US consultant Phil Dorn, conference chairman, will give a talk looking to future developments.

Compec Europe attracts nearly 100 exhibitors

NEARLY 100 exhibitors are booked at Compec Europe, making it the largest show in the series. It will be held at the Centre Rogier International, Brussels from May 8-10, 1979.

Exhibitors include Target Systems, Control Data, Borer Electronics, Harris Corp, and Terminal Display Systems.

The exhibition, sponsored by Computer Weekly, is organised by Iliffe Promotions, another member of IPC Business Press. Applications for tickets should be sent to Room 821, Iliffe Promotions, Dorset House, Stamford Street, London SE1 9LU, tel: 01-261 8437.

In addition, a special travel package has been arranged from the UK. For further details contact Commercial Trade Travel, Carlisle House, 8 Southampton Road, London WC1, tel: 01-405 8666.

Op jailed for wounding PC

A 23-YEAR-OLD computer operator, Richard Maull, was sentenced to two years' imprisonment last week when an Old Bailey jury found him guilty of wounding PC Trevor Wilson with a milk bottle. The assault took place almost two years ago (CW, June 30, 1977), during the Grunwick dispute.

According to the defence counsel, an immediate appeal will be launched.

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Downtime

by Chad

We don't want to worry you, but.....

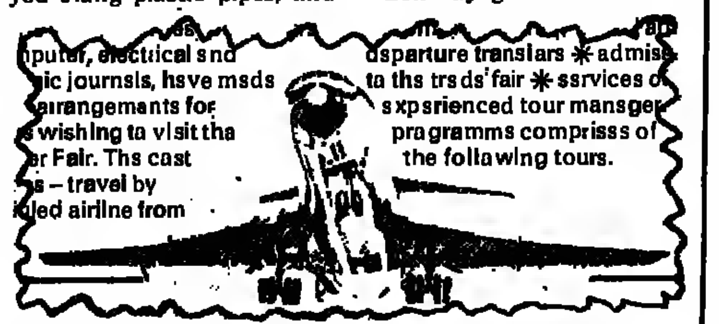
THOSE who are planning to go on Computer Weekly's package tour to Hanover Fair may have been a bit worried about the aeroplane depicted in our advertisement (see tear-out below). Close inspection reveals that the front undercarriage is not in line with the centre of the fuselage. The machine would perform some interesting gyrations around the runway on touching down, you may be sure — interesting, that is, so long as one is not on board.

However, I can reveal now that, by an oversight, we printed a picture of British Aerospace's latest top-secret experimental jet. In addition to this revolutionary landing gear, it has ecologically-sound steam propulsion, and not only are the pilots replaced by microprocessors — the stewardesses are as well. Your food and drink are brought to you along plastic pipes, and using a micro in your armrest you can choose any appetising combination you like of red, white, or blue reconstituted soya bean mush.

Donald Michie's Machine Intelligence crowd at Edinburgh have supplied a robot to demonstrate how to put on your lifejacket. There will, of course, be the standard recorded announcement to say "This aircraft is being flown by a computer and everything is working perfectly . . . (click) perfectly . . . (click) perfectly . .

The backroom boys at British Aerospace are bubbling with confidence that this plane will help them recapture the former glories of our aircraft industry — the R101, the Bristol Brabazon and so on. However, I am assured by the travel agency that you will be flying to Hanover in a perfectly normal plane.

Bon Voyage.



The suspect plane . . . from a CW advertisement.

Such long words

MY eyebrows went up recently when I read in New Scientist that Iann Barron, one of the three founding fathers of Inmos, thought that micros for text handling should have a five-bit word length.

"Prehistoric, Telex technology," I thought. "Batteries of shifts and escape codes," I murmured, remembering all the trouble I had even with six-bit bytes.

Barron reassured me that while he had considered the idea some time ago, he was not in favour of it now.

What then will Inmos plump for, I asked?

He replied, "I think I can guarantee that the word length will be somewhere between 1 and 3,000 bits."

Any bets on the high end?

● I WAS heartened to hear that the Equal Opportunities Commission has hired two social researchers, for the princely sum of £6,000, to find out how many women will be put out of work by new office technology. Obviously they know of some way of getting a reliable answer to this which the Think Tank, ACARD, SPRU, and numerous heavyweight research institutes haven't twigged yet — a new technique for low-budget crystal-ball gazing. Just what we needed, ladies. I shall await the results with bated breath.

Inside story

ANSWER to last week's puzzle about why the new version of GATE is called PILE at Xerox, Palo Alto: PILE stands for Prison In London England. Newgate, get it? Great minds often have a schoolboy's sense of humour, don't they?

From teletypes to text terminals

With the growth of word processing, it is being realised increasingly that terminals using the standard character set cannot satisfy the demands of users engaged in document preparation. JOHN HUNT, a research student in language design at Queen Mary College, University of London, here considers some of the features of various alphabetic scripts, and explains how these may be supplied by an intelligent terminal which can handle a number of different scripts.

THE ISO-7 Data Code, parsimonious with bits, allows 13 of its 94 symbols to be subject to national variation, to cater for additional letters, accents and punctuation marks. As Figure 1 shows, this is at the expense of true international standardisation. We cannot therefore focus our attention upon petty regional practices, but should attempt instead to design a single character set for each script.

A script similar to our own, but subject to a little more exotic variation, is the Cyrillic script, which is based upon the 31 symbols of the Russian alphabet. However, as will be seen from Figure 2, national variants utilise a number of accents, some additional symbols and the technique of fusing two letters or a letter and an accent to form a digraph. Digraphs are also used extensively in some of the Brahmi scripts used throughout India, eg Nagari, which is used for writing Sanskrit and Hindi.

Apart from the use of accents and digraphs, the scripts we have mentioned so far have no characteristics worthy of especial note on the part of terminal manufacturers.

We may also ignore Greek, Hebrew and the International Phonetic Alphabet, used in parts of Africa as well as in philological works. However, there is one other alphabetic script which is of interest: Koranic.

The Koranic script, used throughout the Moslem world, is based upon the Arabic alphabet, which consists of 28 consonants. These may be divided into approximately 17 classes, Figure 3, so that the letters in a given class are all based upon the same character, and differ from each other only by the addition of diacritics.

There is no notion of capital letters, but every character has four logical forms: initial, medial, final and independent. The form of a letter in a particular context is determined by whether it is joined to preceding or following letters. Only two character classes exhibit four distinct physical forms; most are content with two, which differ essentially in the presence or absence of a final flourish. Additionally, certain combinations of letters require special forms (see Figure 4).

A single keyboard divided into blocks for different scripts would be far too unwieldy. Using shift keys and control keys is very time-consuming, and also very tedious and error-prone when typing a text in which consecutive characters come alternately from different cases, founts or scripts. However, a few pedals would enable a single keyboard of modest size to be used for an almost infinite variety of symbols, selecting cases, typefaces, scripts and symbols as suited for the application, and varying degrees of emphasis: but allowing both hands to remain in position on the keyboard.

With more than a couple of scripts available it would not be possible to mark every key statically: but an optical display — possibly beneath an infra-red grid, rather than on a traditional keyboard — could be generated dynamically at every pedal-generated change of script.

A separate numeric keyboard should be provided offering Turkish and Hindu modes as well as our own Arabic numerals. There should also be a two-position switch to control the direction of entry of numbers, since the direction in which they are written is determined by the culture in which the user was raised, and is not a characteristic of the system being used.

Using a VDU with a microprocessor, a user typing in Koranic script need never worry about which logical form of a letter to use, since this is apparent from what had been typed already; and the microprocessor can then decide which physical form is appropriate in the current context, and redisplay the previous character in a different form, if necessary. Special combinations can also be handled automatically.

The same technique could in theory also be used when entering data on a hard copy device, provided that a delay of one or two characters were considered acceptable. Note that the forms are also irrelevant for data transmission and character codes.

Ligatures may be treated in the same manner as connected script, where the transformations are applied automatically (unless inhibited by a zero-width space). Alternatively, they could be formed only when explicitly requested by typing a "create ligature" character. The former method would suit Roman script, while the latter would be more appropriate for Cyrillic, Nagari and possibly IPA.

When right-to-left and left-to-right scripts are mixed on the same line of text, a two-position switch is necessary, to set the state of the terminal according to the dominant or matrix script, so that the terminal knows which direction mixed-script lines should normally be constructed.

Thus we conclude that there are more similarities between scripts than there are differences, so that a single terminal may be used for the typing of a number of scripts. Switching between scripts, cases, founts, etc., is accomplished by means of pedals, so that both hands may be kept on the keyboard.

If a microprocessor is present, ligatures and context-dependent forms of characters may be displayed, where the appropriate forms are computed locally. An alphabetic keyboard of sufficient keys, including accents, punctuation marks, should suffice for most scripts; changes of case and fount do not require the keyboard to be relabelled, but for changes of script other methods may be used to effect dynamic relabelling.

The use of proportional spacing — incorporated in some of the earliest typewriters, only recently re-emerging — is essential for Koranic script and desirable elsewhere when ligatures are used.

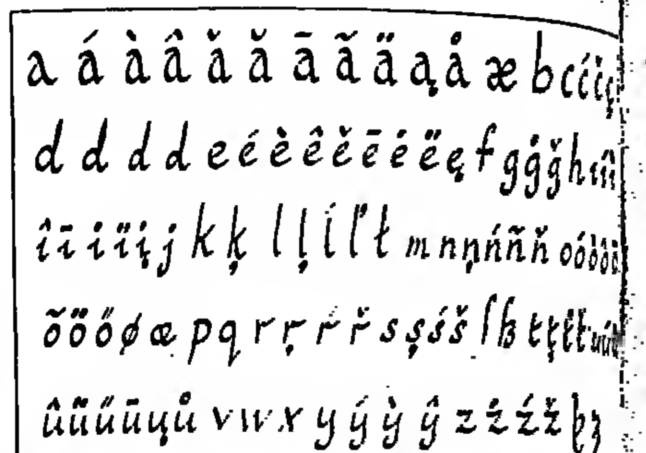


Figure 1: A selection of letters used in Roman script.

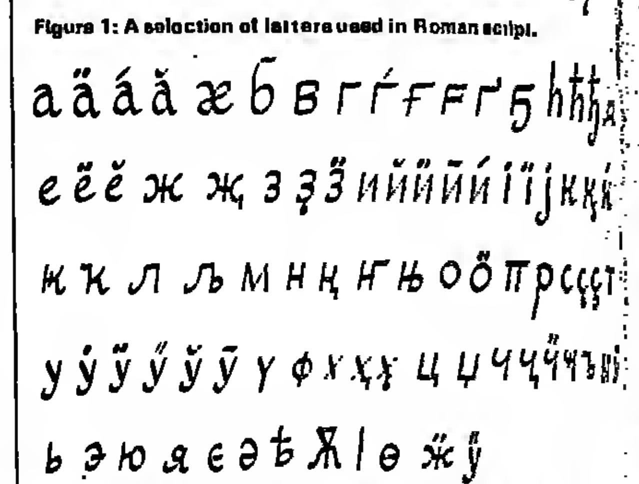


Figure 2: A selection of letters used in Cyrillic script.

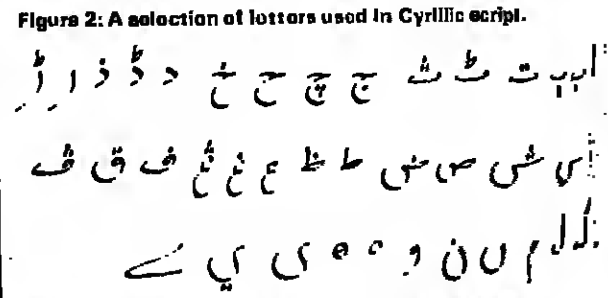


Figure 3: A selection of letters used in Koranic script.

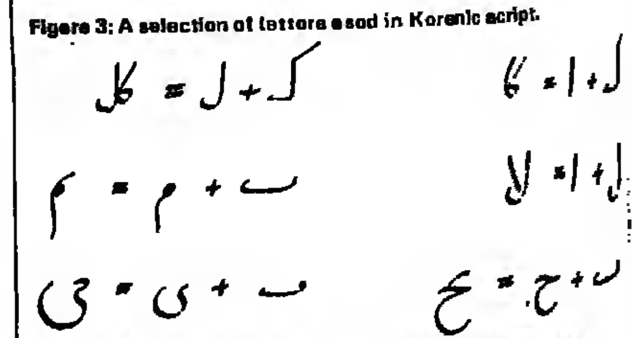


Figure 4: Some special combinations used in Koranic script.

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Party rivalries could turn opportunities of new technology into a disaster—Peter Walker

POLITICAL party rivalries, plus the use of ministerial showmanship, could turn the far-ranging opportunities offered by computer technology into a "disaster". So concluded Peter Walker, Conservative MP for Worcester, at the European Computing Review 1979, organised by Infotech International last week in London.

To prevent this happening, he said, there was a need for better government control, and better public policy decisions must be implemented.

Outlining the prospects for continued technological growth in the UK, Walker said: "The government must put the opportunity into its correct perspective, persuading the country by both example and exhortation of the importance of this new technology.

"The right balance has to be struck between expecting changes to lead to the creation of Utopia and the idea that major changes will not occur."

As far as the "market" itself was concerned, Walker suggested that the government should take up the slack and tackle the type of problems the market cannot.

"Some of the political problems ministries of the 80s will be faced with include the timing between jobs being destroyed and new ones being created; the mismatching of skills; and potential geographical mismatching as some regions decline while others extend as a result of new technologies."

Public policy would form an integral part of any plan for progress, and among prime areas were education and retraining; incorporation of microprocessor techniques within government departments; a better approach towards employment; employee participation and more efficient social services.

"We have the circumstances in which we can create Athens without the slaves . . . only the folly of man prevents us from taking advantage of this unprecedented opportunity," concluded Walker.

WALKER . . . "disaster" warning.

No relaxing of PTT monopolies, says poll

MORE than half the respondents to a Delphic poll, held by consultant David Hebditch at the Infotech European Computing Review last week thought that PTT monopolies would never be liberalised.

Of the 140 attending the data communications session, 90 responded to the 15 questions in the poll.

Well over half of them thought that trans-border data flows would be generally subject to regulation and/or taxation by 1990, and all thought that X25 packet services would be available in their own country by that date.

About two-thirds of the responses indicated that multinational companies would switch from private to public networks between 1985 and 1994 and that X25 would be replaced by some other standard in the same period.

Eight user contacts with EEC named

COMPUTER users in the UK who want to convey their views on any aspect of data processing to the EEC Commission can now contact eight people who have been nominated by the National Computer Users Forum. NCUF is the UK member of the Conference of European Computer User Associations, the body that is now recognised as the official representative organisation for computer users in the EEC (CW, December 7, 1978).

Each EEC country now has a member user association in CECUA and each association has appointed one co-ordinator to deal directly with the EEC Commission in one particular area of interest. In the UK, the NCUF has appointed the co-ordinator for standards — Brian Buss of the Central Electricity Board (CW, March 15).

Buss provides UK users with a direct link with the EEC Commission on standards, and seven other individuals have now been nominated to convey UK users' views on other areas of interest to the appropriate co-ordinators in other EEC countries.

The controversial topics of data privacy and security are being handled by Hugh Pitcher of the National Computing Centre. He will liaise with the co-ordinator for that subject who is based in Italy.

The telecommunications man is Stuart Goold of Nottingham University, a leading light in the ICL CUA, who will liaise with the Belgian co-ordinator, while matters on maintenance should be conveyed to Graham James of Empire Stores, deputy chairman of the IBM CUA. The maintenance co-ordinator is in France.

Professor Frank Sumner of Manchester University, president of the BCS, will talk to the education and training co-ordinator, who is based in Denmark, while Gordon Cunningham of the Local Authorities Management Services and Computer Committee, Lamsac, will convey views on small systems to the co-ordinator for that topic in Holland.

The subject of social implications of computers is being handled by Dr Douglas Eyions of BOC Datasolve, who will liaise with the co-ordinator in Ireland. Contractural links between users and manufacturers is the topic that the West German coordinator is dealing with, and the UK representative is Ted Sambridge of the CEGB.

Sambridge is the chairman of the working party set up by the Institute of Purchasing and Supply that is drawing up a set of model conditions for hardware purchasing.

CAD/CAM at McAuto

THREE years after taking it over in April, 1976, the McDonnell Douglas Automation Co (McAuto) has consolidated the activities of its wholly owned subsidiary United Computing Corp with its own computer-aided design and computer-aided manufacture division.

United Computing Corp, of Carson, California, produces both Uniapt, a numerical control system, and Unigraphics, used for interactive design and drafting.

These operations have now been merged with those of McAuto itself, which has developed systems including CADD, Fastdraw, Compudrive, and Mdcnpt. Staff at the Carson facility, numbering around 150, will become McAuto employees and will operate under the control of the recently established McAuto CAD/CAM division.

Union takes flexible stance in report on WP

"REMARKABLY responsible" is how the Apex report on word processing (CW, March 22) was described by Pat Coen, chairman of office systems supplier Logica VTS. In the report, Coen told Computer Weekly, the white collar union is taking a much more flexible stance over new technology and possible loss of jobs than many other unions have up to now.

Coen praised the thoroughness and accuracy with which the report describes the technology of word processing, and said that after reading this, union members would be well informed about the new developments and therefore less scared and worried.

The report is also responsible about VDU health hazards, he said, making it clear where there is hard evidence of dangers.

Regarding the Apex proposal that firms should have to continue paying workers they had made redundant, Coen said that from his personal point of view, society as a whole should take on this responsibility. In extreme cases, he said, Apex's requirement might drive out of business companies that could otherwise survive.

Harry Belsey of BP disagreed strongly with Apex's view that there is a serious threat of unemployment among office workers.

Apart from the ever-increasing workload in offices, Belsey said there was going to be an enormous market in public online databases on such services as Prestel.

The sheer volume of keyboarding involved in creating and updating these bases could be so great that we would have to export the work to the Third World, he said.

There is also a great deal of potential employment for low-grade staff, Belsey added, in doing better, work that is currently being done badly by high-grade people! Keeping manuals and other documentation up to date properly is one example Belsey gives.

He says plenty of interest is currently being generated at BP in developing new fields of work such as this.

Rift is no bar to business

INDICATING that the reported rift between ICL and Telecomputing is not an obstacle to joint businesses, ICL Australia has signed a contract for a further six TPS licences. Destined for facilities management customers, the first two will go to town council installations in Sydney and Townsville.

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MICHIE'S PRIVATEVIEW

The impact of computers on everyday life

AS the citizen struggles to comprehend the computer's likely impact on everyday life, he or she is subjected to a numbing repetition of two basic themes, namely Think Big ("Our institution's system can even do that too!"), and Think Small ("This one can actually be worn as an *ear-ring*!"). The real action, however, belongs neither to the one nor to the other, but to a creative possibility of interfacing the two. The development, when it comes, is called Telesoftware.

As is well-known, a universal-text market is about to appear in the form of viewdata. For what purposes will the user want to pay to retrieve slabs of text? He will want to *read* it of course — a menu, a sonnet, a news report, a list of local strip-joints, a manual on microprocessors, a travel guide, a set of do-it-yourself instructions for mending a burst pipe.

Is that all? Well, what else is text good for, except to read?

Suppose that instead of lengthy do-it-yourself instructions, the text consists of a compact *program* to be interpreted by the would-be plumber's own home micro . . . or maybe the viewdata subscriber is not a householder but a school, a hospital, a business, or some other institution which has a computer and wants to shop around for programs. A market-place for text now acquires a different dimension. Indeed, CAP has a system by which program text could be read directly from viewdata into the micro's own local storage without necessary exposure to human gaze.

But the PO's monopoly of the Prestel implementation of viewdata, and of the uses put to Prestel's telephone connection with the user's television set, allows them to determine when and whether the new facility will make its debut. PO approval is required, but the PO coyly tantalises.

While waiting for the Post Office to come to the boil, let us roam in fancy through some application areas.

The British Medical Association could amass under its authority an incremental library of diagnostic and patient-interview routines for approved micros in group practices, health centres, clinics, medical schools and hospitals. Better — all routines could be written in a standard order code such as CAP's "intermediate language" or in any high-level language which could be compiled into this code.

The code defines a single abstract machine, for which CAP issues emulators for all the main micro lines.

Actual running of the routines, the computer-patient interactions, the clinical interpretation of print-outs — all these would be conducted under the personal supervision of medical staff. Current levels of staff overloading will make such a possibility seem heaven-sent.

Now substitute "Department of Education" for "BMA," and for doctors and hospitals substitute "teachers" and "schools." The same idea obviously carries across.

What about the householder? Wouldn't he like to take a tax-advice program down from the viewdata-displayed wares of some accountancy-minded software house and run it on his home computer — if he had a home computer. But that's only for hobbyists, surely.

Not so. Every TV-owning home will have one if recent developments in video games can be taken as a portent.

The Bally Professional Arcade is a programmable video game unit, with 24-button keyboard, cassette storage, three built-in games plus a 5-function, 10-memory calculator. Remote pistol-grip controllers manipulate characters and symbols on the screen. Additional cartridges (£10-£20 each) offer Poker, Checkers, Red Baron, Football, Bingo Math, Spell 'N' Score and other games. Initial price is about £150.

The critical feature is a £25 cassette called Bally Basic, with keyboard overlay and 130-page manual. For another £25 an audio cassette interface allows transfer of files via conventional cassette recorder to audio tapes. More add-ons include full typewriter keyboard and various plug-in interfaces.

So what starts as a video game system transforms its owner by degrees into a home computer user. Indeed, 80 per cent of those who purchase the Arcade say that they hope to be transformed.

I have yet to come to the most conspicuous anticipated impact of Telesoftware, namely in business data processing. Off-the-peg Micro-Cobol programs for the office desk-top system will assuredly tap a potentially enormous market reservoir, the small businesses of Britain.

Did I say "assuredly"? As noted earlier, only he who can read the vast cerebral rhythms of the Post Office has a claim to any assurance in this matter.

Donald Michie

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SOFTWARE FILE-1

Online 'utility' system from Itel

STATING that it now aims to become a leading supplier of IBM-compatible software in addition to hardware, Itel has launched an online applications development system that will be actively marketed not only to its own Advanced System user base, but also to IBM users in general.

Called Taps and available for all current IBM operating systems, the new software was described by an Itel spokesman as a "computer utility system" and appears to consist of a bundle of interactive facilities not previously found in any single product.

It does, though, contain many elements usually associated with a TP monitor along with facilities for interactive program development.

One specific capability identified is dynamic screen definition, permitting applications to be designed at the terminal. The package also includes a query language and report generator capable of accessing a variety of DBMS files.

Early Itel documentation on the system targets it squarely at the vital issue of programmer productivity, saying that it facilitates "application development, maintenance, tuning and production operations."

"Routine functions required to develop, execute and maintain online systems are controlled by a series of tables which are maintained conversationally," the paper says, adding that "Taps can also interface to several TP monitors and database systems."

Where no TP monitor is in use, "it may provide communications monitor services."

The software, which is priced in the US at between \$25,000 and \$40,000, is the latest in a series of recent software announcements by Itel which have been received with great interest in the US, but have so far attracted little attention in this country.

Common to all the products is the fact that they are targeted at the full range of IBM and IBM-compatible systems.

Most recent of the introductions was the launch last week of Microfast, Itel's microcoded assist for VS1, which is specifically tailored to the 145 (CW, March 29).

In January, the company announced that it was to [...] Prepso, a conversational [...] editing and RJE system for [...] Including a full screen [...] Prepso is seen in particular [...] competitor to ADR's Roscoe [...] runs either with its own [...] munications line driver or [...] CICS.

A version for MVS is [...] stood to be nearing completion.

Like Taps, which was [...] iginally developed by [...] Strategy Corp. of New [...] Prepso was also originally [...] loped outside Itel, in this case [...] Armaggedon Associates [...] ville, California.

Prior to Prepso, Itel in [...] came out with a program [...] work-station — a [...] gram development system [...] sisting of both software [...] hardware and designed [...] offload programmer work [...] the central processor.

Called Maestro all [...] around hardware from [...] Phase Systems, it was [...] by Softlab GmbH of [...] supports program [...] in Cobol, PL/I, Fortran [...] It can be connected to [...] of mainframe, including [...]

Itel will not be [...] Maestro outside the US.

A strong software [...] has been seen for some [...] crucial to the survival of [...] plug-compatible manufac[turers] and the rich crop of announce[ments] so far from Itel — [...] more expected — must give [...] edge in some respects over [...] main competitor, Amdahl.

Amdahl has up till now [...] centrated on enhancements [...] the system control program [...] level — such as its VM [...] hypervisor — and has shown [...] signs of attempting to [...] even these products outside [...] own user base.

In choosing to apply its [...] siderable marketing and [...] skills to products brought [...] from outside, Itel's emerg[ing] software policy is closely [...] with that pursued by the [...] pany in the hardware field.

Package for Fortran graphics finds favour

BRADFORD University's Fortran graphics package Simpleplot has attracted a high level of interest both in the UK and overseas since first coming to light six months ago (Software File, September 7, 1978).

Nearly 30 universities have now installed it, including educational institutions in Germany, Australia and New Zealand. It has also found a number of non-academic users, including Hunting Engineering, the Anglia Water Authority and ESTEC, in Holland.

At the same time the package has proved remarkably portable, having been implemented on several further systems, including Prime minicomputers, the Data Control Nova and the PDP-11.

This is attributed by the developer of the software, Judy Butland, to the strict observance of the Fortran IV language standard and the fact that no files are used — making the package totally system-independent.

The software has also proved remarkably robust and easy to use, needing virtually no support.

"We occasionally ring round the installations to ask them how it's going," noted Mrs Butland, "but all they ever say is that it's OK."

Simpleplot, which was developed in conjunction with users over a number of years, is offered free by Bradford to other universities, and at £500 to other users.

Since last year, a bound user manual has been produced for the system. Containing complete specifications and sample programs, it is available at £1.50 from the Industrial Liaison Manager, University of Bradford, Bradford BD7 1DP.

The university is still willing to co-operate with a software house in the further distribution and marketing of the package, and any company interested should contact the Industrial Liaison Manager as above.

Puzzler

$$\begin{array}{r} _\ _\ _ \\ _\ _\ _ + \\ \hline _\ _\ _ \end{array}$$

ALL nine digits in this addition calculation are different, and the three-figure sum is the lowest possible under these circumstances. Can you work out the nine digits?

If you get through that one very quickly, try searching for the lowest (x+y+z) total for the equation

$$\frac{1}{x^2} + \frac{1}{y^2} = \frac{1}{z^2}$$

See page 61 for solutions.

What's your line?

Please tick as appropriate

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COMMERCIAL BUREAUX moving into the remote job entry and telecommunications market.

MANUFACTURERS OF TERMINALS and their agents who wish to avoid the capital commitments that offering their own rental service entails.

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SOFTWARE FILE-2

By Peter Hewitt

Tripartite talks on marketing follow CPP sale to ADR

HAVING sold its five principal software marketing companies in Europe to ADR (CW, March 29), Computer Program Products is facing an interesting situation with its other main source of software, Boole and Babbage.

At the heart of the problem is that Boole and Babbage has for the past year had two European agents, one being CPP and the other the European Software Company, a firm founded almost exactly a year ago, and in which B&B has a 37.5% holding.

This dual representation, under which ESC has rights to two B&B products with CPP marketing the rest, will now be undergoing close scrutiny while CPP is still in the process of rebuilding its Continental operation.

It appears to have arisen originally for two main reasons.

The first is that B&B's Resolve — a real time monitor for IBM's OS — is usually seen as a competitor for ADR's Look. It could not therefore have been marketed in Europe by CPP, which had been selling the ADR system since 1975.

The second is that B&B almost certainly wanted a more direct financial and technical involvement in the lucrative European market. The size and growth rate of this market has recently prompted similar initiatives not only from ADR but also from MSA, the leading US supplier of financial application software (Software File, March 22).

On the other hand, B&B has so far given every indication of favouring each of its European outlets equally.

ESC, for example, was given marketing rights to its OS security system Secure (Software File, June 8, 1978) while CPP was earlier this year licensed to sell CMF, a comprehensive performance monitor for MVS (Software File, March 8).

It is clear, however, that with CPP's sale of its highly-regarded — and highly successful — Continental marketing wing, a significant re-appraisal is now underway.

Senior management of all three companies involved — B&B, CPP and ESC — are meeting in London this week and will be discussing the critical question of future marketing arrangements.

According to B&B marketing vice-president Bob Coolidge, this meeting is strictly exploratory in nature.

"We don't currently have any formalised plans," he said from California last week, adding that CPP had made some "interesting propositions."

One issue certain to be at the forefront of discussions is the level of CPP commitment to its declared intention of re-establishing in Europe.

B&B management will at the same time be reviewing the plans of ESC, together with its sales achievements in this its first short year of operation.

On the side of CPP, B&B is faced with a strong and established company that already has 10 years' experience of successful marketing throughout Europe.

Indeed it was undoubtedly the outstanding success of CPP, together with its close relationship with ADR, that prompted the takeover action. ADR could equally have set up its own European selling network, simply by not renewing the CPP licences, usually renegotiated each year.

This course, though, would not have given ADR the benefit of CPP's existing premises, staff and goodwill.

Although the majority of its business has up till now come from ADR products, CPP has also devoted considerable attention to the B&B line and has built up parallel teams expert in performance monitoring software — B&B's main product range.

These staff are likely in the main to find it more attractive to stay with CPP rather than join the ADR companies. Thus CPP's expertise in this area will probably continue to be available to B&B.

CPP has also been making strategic moves for some months now clearly designed to ensure its survival in the rapidly changing software products business.

The most significant of these has been the gradual building up of CPP's own product line. This has so far resulted in the acquisition of two West German-developed products (Software File, December 14, 1978) and is likely to be followed in the near future both by more acquisitions and by internal development projects.

Recent events have also given a new significance to an otherwise puzzling move made by the company last autumn. This was the relocation of its 15-strong technical services group from Amsterdam to new purpose-built offices in Richmond, Surrey.

On the side of the European Software Company, this relative latecomer has enjoyed a considerable degree of success since starting to trade last year.

Helped in West Germany by data protection legislation, it has installed some 60 copies of Secure since its launch in Europe last June. It has also made considerable inroads with Tone-3, of which between 30 and 40 copies have been sold.

Not a B&B product, Tone-3 is an implementation of TSO for VS1 (Software File, June 29, 1978) and has again been best received in West Germany, with only one customer having been found so far in the UK.

In deciding on its future European representation, Boole and Babbage is faced not only with commercial considerations but also with technical arguments. Both tend to favour consolidation of the range in the hands of a single agent.

One example cited of the technical factors favouring this course is the growing commonality across the range of its systems monitoring software. CMF and Resolve, for instance, now share the same extractor program and are shortly to be supplied with a common interface.

In the face of this close relationship, it appears to make little sense that the systems are marketed and supported by two completely separate companies.

Urgent —prod tools wanted

A NEW urgency is becoming apparent in the search to find faster methods of system and program development.

Usually lumped together under the general title of "productivity tools," such methods and aids are designed to counter two dominant trends currently holding back the rate at which new systems can be implemented — or existing systems brought up to date and bug-free.

The first is that experienced DP staff are simply not available in sufficient numbers, with the shortfall of programmers estimated recently to be as high as 20,000 in the UK.

The second is that DP budgets are not fully geared to the rising cost of systems and programming work. Although hardware costs are falling, most of these potential savings in fact appear to be absorbed by expanding configurations, and more installations.

Both these trends have been explicitly acknowledged in recent industry announcements, one of the most striking examples being IBM's launch of the mass-market 4300 series.

IBM has of course declared itself concerned about productivity in the past and its Improved Programming Technologies, IPT, were in part aimed in this direction.

It has also stressed the role of interactive development facilities such as CMS and TSO.

With the 4300 series, however, productivity really emerged as the keynote for the first time.

Key 4300 productivity features already highlighted (CW, February 15) include pre-generated system software, the System IPO/Es; packaged application software, such as Barpics; greatly extended interactive facilities; and new methods of software support — the latter aimed at IBM's own productivity problem, the impossibility of offering the traditional labour-intensive support to the enormous numbers of 4300 customers anticipated.

All of this was a revealing example of one major manufacturer's plans for coping with the shortfall of computing professionals.

PROGRAMMER NOTES

This though is not the only direction in which work is proceeding and, in the words of Arlo Guthrie, that's not what I came to talk to you about.

However what I did want to discuss — namely Kit Grindley's Systematics, and a preprocessor generating Cobol from high-level Systematics' specifications — will now have to wait for another occasion.

Suffice it to say that a recent meeting of the BCS Cobol specialist was rightly enthralled by a description of this system, under the alarming title of "The end of Cobol as we know it."

MMS 2900 version launched

A NATIVE mode ICL 2900 version of the popular MMS general ledger system was announced by Package Programs Ltd at its user meeting in London last month.

[...] now has over 100 customers worldwide using the [...] of the software, and expects to top the 100 mark in the [...] later this year. Sales of the package earned PPL around £250,000 in the last quarter of 1978 alone.

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CW

OP SPOT — By Bernard Allen

'Them-and-us' state of the industry

"I HAVE been stimulated into commenting on some of your articles in Op Spot because I believe them to be highly misinforming and irresponsible." Thus A. S. Gorski, an operations manager who has recently been "catching up" on his reading of Computer Weekly, gives vent to his feelings.

He shares some of my views — "Like yourself, I like to stand up for operators . . . because their contribution to a site is not always fully appreciated" — but he questions a number of suggestions put forward in Op Spot.

"Do you really believe that the majority of operators wish to be consulted about the software and hardware that their company intends purchasing? Just how involved should they be?

"Should they take part in the evaluation of it, including tests, write-up, etc? Do you really believe the majority of operators want to do this? Are they competent enough? And who will do the operating?"

In his view, it is possible for only a few of a site's operations staff to advise on the above, or become involved in such matters as interviewing applicants, assessments, computer room layout and scheduling.

He continues, "I have tried on many occasions passing on some of my responsibilities to operators. Most operators are not interested because extra involvement and responsibility means more work!"

He agrees that an increase in workload should be rewarded, but points out that new hardware and software can, in fact, make the task of operators easier.

"Fixed discs do not need to be loaded and unloaded. There are self-loading tape drives, self-cleaning printers, diskettes instead of cards.

"Good managers will be sensible, will recognise an increased workload and pay more. Sensible operators will air their grievances and discuss them with managers; they will build a solid relationship with one employer, rather than job-hop in the current employee-hungry market-place."

Summing up his feelings, he comments, "I think you owe it to everyone in the industry to admit that there are good managers around, encourage the good managers, educate the bad ones and, rather than create a 'them-and-us' situation for managers, make operators realise that they ought to be grooming themselves for the future."

I would like to thank Gorski for sending me such a well thought out and interesting letter to which I would like to reply.

Firstly, he accuses me of writing "highly misinforming" articles. Well, during my 18 months as Op Spot columnist I have never knowingly given incorrect information.

As for being irresponsible, that's just not true. I have not created a "them-and-us" situation between operators and managers — it started long before Op Spot arrived on the scene.

The fact is that many operators are unhappy with their lot — I have a file full of letters to prove it — and are sick and tired of being the poor relations of the computer industry.

As far as managers are concerned, I agree that there are both good and bad. And in past Op Spots we have published quite a few letters and hints sent in by the aenlor gradea.

I have interviewed several of them. Chris Nunn, data centre manager at the Chiswick installation of Marks and Spencer, and Barry Johnson, operations manager at Sperry Univac's benchmark centre in West London, are two who spring immediately to mind.

Both head efficient, well-run sites and encourage career progression.

Let's be clear about all this: Op Spot is for operations people of all levels. If a person has something worthwhile to say, I am willing to present his viewpoint.

Gorski asks a lot of questions. I don't claim to have all the answers, but I am aware of the problems faced by operations staff.

He says that I "owe" the industry a number of things. He's wrong — the industry owes them to itself. The industry owes it to itself to take advantage of the experience and ability that exists within the operations fraternity.

HINT OF THE WEEK

Defining the status of files under George 2+, 2S

IN past Op Spots we have had a number of hints relating to the problem of finding out which discs, or cartridges, are online in the ICL George 2 environment.

The subject was first raised by Brian Miller, a project manager at RHP Bearings in Knottingley, Yorkshire. He proposed a modified version of the ICL file mapping utility, XPJD (CW, October 26, 1978).

Then Gerry Walker, a project leader in the technical support section at the Birmingham installation of Triplex Safety Glass, sent in a listing of a program "built" for the very same purpose (CW, November 30, 1978).

A week later he followed that up by submitting a store resident utility intended for use at George 2 sites which have a large number of disc drives.

Now we have a hint which suggests how the operator's task may be eased at George 2+ and George 2S installations. It is sent by Alan Sockley, who is employed in the technical planning section of Black and Decker's Littlewick Green, Berkshire site.

He writes, "At George 2+ sites it is not necessary to have a special program to check the presence of a cartridge, just a host program which, ideally, should be the smallest program in the installation.

"Normal check programme search for the presence of a particular cartridge, and if it is not online (or online in a situation where it should not be present) a halt in the George macro, requesting the operator to make the cartridge available, occurs.

"But it may be some time before the operator can put the disc up, and he may forget about the halt until he does his next program list check.

"A macro can be written, using very few labels, that works on similar lines to a TSN request — it displays the cartridge required at timed intervals and will automatically restart within a timed interval after the cartridge is loaded."

He proposes the following two macros. Both instruct George 2+ to set up a zero length file on the disc which is to be placed in an online or offline state.

If it is unable to do so, the macro is put into a loop, with the result that the operator receives a message at regular intervals (in this case every 90 seconds).

The first is for placing a cartridge online:

```
MACDEF CSN
IN ED (PROGRAM DISC (4096))
LOAD CSNS
REVISE 93
ER DCSNFILESYSX [illegible]
UP 17
GOTO 90
91
DISP 'LOAD CSN [illegible]
WAIT 85
90
CEFAIL 91
CE DCSNFILESYSX [illegible]
ER DCSNFILESYSX [illegible]
DOWN 17
ENDMAC CSN
```

The second is for placing a cartridge offline:

```
MACDEF NOTCSN
IN ED (PROGRAM DISC [illegible]
LOAD CSNS
REVISE 93
ER DCSNFILESYSX [illegible]
UP 17
GOTO 91
90
DISP 'UNLOAD CSN [illegible]
WAIT 30
91
CEFAIL 92
CE DCSNFILESYSX [illegible]
ER DCSNFILESYSX [illegible]
GOTO 90
92
DOWN 17
ENDMAC NOTCSN
```

How to make sure the recruit fits in with the shift team

WITHOUT suggesting that personnel officers, DP managers, operations managers and the like are incapable of recruiting new operators at trainee level, is it fair to leave the shift leader out of the selection process?

After all, he is the person responsible for training the new recruit and ensuring that he fits in with the rest of the shift team.

Surely he must have a say in deciding whether or not the applicant is suited to life in the computer room.

These points are raised in a letter to Op Spot by a shift leader employed at an installation in the Midlands.

He comments: "All right, one might argue that the interview should be conducted without the shift leader and that selection should be based on the applicant's academic qualifications and previous work record."

But he points out that the computer room is a "very close knit community" and stresses the need for good working relationships between the operators.

He continues: "Therefore, before accepting the applicant as a part of his team, the shift leader must be sure that he will get on with the other operators."

As I see it, he has touched upon a very important subject; one certainly worthy of further consideration.

He refers to trainees, and implies that he has in mind school-leavers and persons with, say, three or four years' work experience.

Remember, though, that operations staff are recruited from a number of different sources. Let's briefly consider some of them and just what each has to offer the operations department.

Take the school-leaver: he will probably be keen and capable of picking up the technical side of the work pretty quickly.

On the other hand, he has no experience of life at work and therefore is not just learning

"From the left, NUMBER!"

how the operations department runs, but also about dealing with people in general.

And after two or three years at the installation, unless the company has a good career progression scheme, he might be tempted to leave the site for another, in search of better promotion prospects or more money, or both.

Some installations, particularly those in banks, take on a considerable number of new recruits every year and seem to accept the fact that many of them will leave once they have been trained.

Other sites go for the experienced operator; the person who has been operating for, say, 18 months to two years.

Of course, he is more expensive to employ than the trainee, and the site which fails to make full use of his technical expertise is wasting both its own money and his time.

Managers who are losing a lot of their operations people would be well advised to bear in mind that many staff consider themselves to be very much an operator first and company employee second.

Incidentally, a recruitment consultant I met recently said that many sites are reluctant to take on mature, untrained staff such as ex-Servicemen.

Well, I know of one installation where they are employed as tape librarians and a very good job they do, too.

The more mature person is likely to have a level-headed approach to work and be used to discipline.

However, shift work can be a problem for them and sometimes they take longer to adjust to their surroundings and are slower to learn than the younger person.

Site visits

I AM currently looking for an installation to visit and feature in Op Spot. If you think your site is particularly interesting, please contact me at Computer Weekly (01-261 8035) to discuss the matter — providing your manager agrees to it, that is.

Eye exercises

THERE has been considerable interest in the report on the exercises for VDU operators devised by Warwick-Evans (Op Spot, March 22). The company's name and address was given to enable readers to obtain more information, but unfortunately an incorrect telephone number was printed. Warwick-Evans Optical Co. may be contacted at 22 Palace Rd, Bounds Green, London N11. Tel. 01-888 0051.

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Honeywell revamp for Level 64 family

HONEYWELL has revamped its Level 64 family of medium scale mainframes and has added two models to the bottom of its Level 66/DPS line in what the company regards as its biggest group of product announcements since the Series 60 was introduced five years ago.

1 Mbyte for £130,000

THE new Level 66/DPS machines are the DPS-44 and DPS-62, both of which feature less powerful versions of the Level 66/DPS processor announced early last year (CW, February 9, 1978).

Like the bigger 66/DPS machines, the new models employ Ascii code rather than BCD to eliminate the need for code conversion in data communications and also to achieve code compatibility with the Level 6 mini.

The DPS-44 and 62 both employ 16K bit memory chips enabling Honeywell to offer a one Megabyte processor for £130,000. The maximum memory capacity is four Megabytes. Honeywell says that 16K chips will be available with the bigger 66/DPA machines later this year.

The 44 and 62 come with the same systems software as the bigger machines, including the GCOS operating system and the DM IV data management software.

The bigger systems are the DPS-100, -200 and -300, which each have two processors, and the DPS-400 and 500, which come with three and four processors, respectively.

The new machines will be built at Newhouse in Scotland for UK customers.

The new Level 64 machines are called the Level 64/DPS-2, -4 and -6, and supersede the existing Level 64 line. They come with 16K bit memory chips and offer more power. The DPS-2 is twice as powerful as the earlier entry level model, the 64/20, while the DPS-6 outperforms the previous top end of the Level 64 line by 17%.

Like the earlier Level 64 machines the 64/DPS models are built in France by CII-HB.

On the software side the Level 64/DPS machines operate under an enhanced version of the Series 60 operating system, GCOS. Enhancements include QDS, Query Driven System, a file manipulation system that includes an easy inquiry language, and IOF, Interactive Operation Facility, an interactive program development system.

There are interactive compilers for Cobol, Fortran, Basic and RPG II.

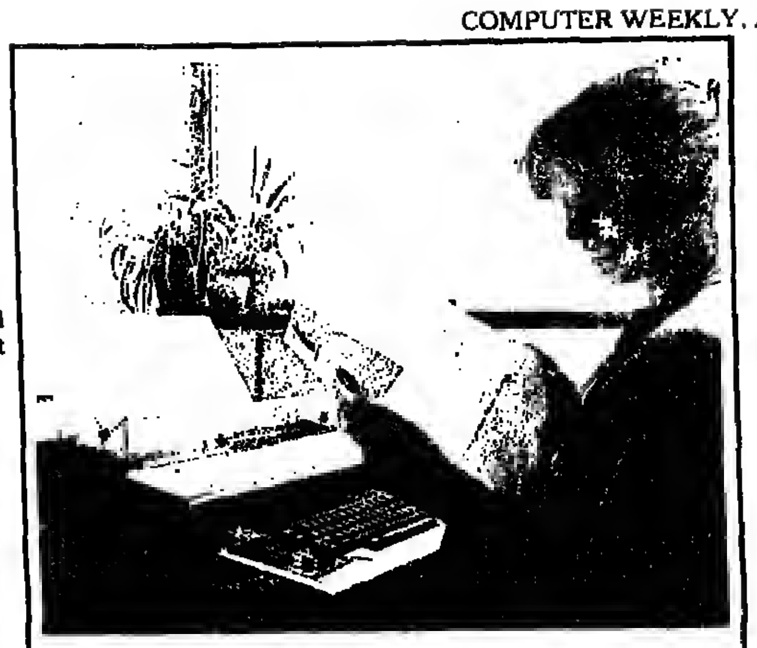
There are also several enhancements to GCOS that enable a DPS/64 machine to work with remote Honeywell Level 6 minicomputers, in keeping with the overall DPS, Distributed Processing System, concept.

FTF, File Transfer Facility, enables files to be exchanged both ways between a 64/DPS and a Level 6 machine, while Interactive Entry Facility, IEF, is used with FTF and the existing Data Entry Facility to enable a 64/DPS to directly address a remote Level 6 based terminal.

Remote Batch Facility, RBF, allows a remote Level 6 to submit jobs for execution on a Level 64 host, while TCF, Terminal Connection Facility, is intended to reduce the number of lines needed to support a given number of terminals by enabling a group of Honeywell VIP 7250, 7001 or 7750 terminals to be connected to a Level 6 and via that to the 64/DPS.

Homeward bound

CONSULTANCY work in the UK last year increased twice as much as overseas business for member firms of the Management Consultants' Association, according to their annual review. The figures, 31% for home business and 16% for abroad, are a reversal of 1977's trend.



That exotic look

AN exotic housing and a low price are features of Olivetti's new stand-alone word processor, the TES 401. It has a single-line plasma display as does the existing model 501, but uses mini floppy discs instead of standard ones and is hard-wired rather than being driven by software from the disc.

Costing between £4,000 and £4,900, the TES 401 has 7,800 bytes of RAM, the contents of which can be dumped to and from the mini floppy when required. Editing features include justification, proportional spacing, automatic centring, and subscripts and superscripts.

The printer is a daisy-wheel mechanism of Olivetti's own design, running at 35 characters per second, with three typestyles available. The plasma display is 20 characters wide, 15 characters of data and 5 status indicator codes.

CAD—the next ten years

SIGNIFICANT developments in the use of computers as design aids will be covered in the fourth international conference on the subject, CAD80. The event, sponsored by Computer Weekly, will be held at the Brighton Metropole Hotel, from March 31 to April 2, 1980.

The aim of the conference is to prepare for the next decade of computer aided design, by discussing various theories, ideas and application case studies.

The programme will include film shows, a buyers' forum and an exhibition of equipment.

Papers are invited for presentation at CAD80 in areas ranging from applications in civil engineering and architecture, to geometric design and basic techniques. Those intending to submit a paper should submit four copies of 500 to 700 word extended abstracts before July 31, to the Conference Organiser, Chris Rawlins, IPC Science and Technology Press, PO Box 63, Westbury House, Bury Street, Guildford, Surrey.

Agreement on all sides in the micro debate

A SURPRISING measure of agreement is being reached on all sides of the national debate on microelectronics, according to Albert Booth, Secretary of State for Employment. At this stage, he said, it is widely accepted that new technology is vital for our international competitiveness, and also, it is too early to know what the overall impact on jobs will be.

The Employment Secretary was speaking at the launch of the published proceedings of the AUEW (TASS) conference on Computer Technology and Employment, at which he also spoke (CW, September 21, 1978).

The book is published by the NCC and comprises the papers presented, the panel discussions, and questions from the floor, and a series of background papers on the growth of electronics in industry, and on applications of computers to design and manufacturing.

Booth described the study that is going on in his department on the human and technical effects of microelectronics, trying to identify the skill requirements of the new technologies and the possibilities for retraining. Its results should be published this autumn, he said.

It was interesting to note, Booth said, that in some areas where they thought there would be a drop in employment, it had not taken place. Banking and insurance were two examples he gave.

Published at the same time were the NCC's Computerisation Guidelines, the results of a study carried out for the EEC's Social Fund. These aim to help everyone in an organisation — management, shop-floor supervisors, workers, and computer staff — to understand each other's concerns when computers are being brought in.

Soicon installs modelling system

SCICON'S Milton Keynes bureau has installed the econometric modelling system Hash, originally developed by the Economics Department of Southampton University.

Designed to enable economists and planners to build linear financial models, the software was also installed recently by SIA.

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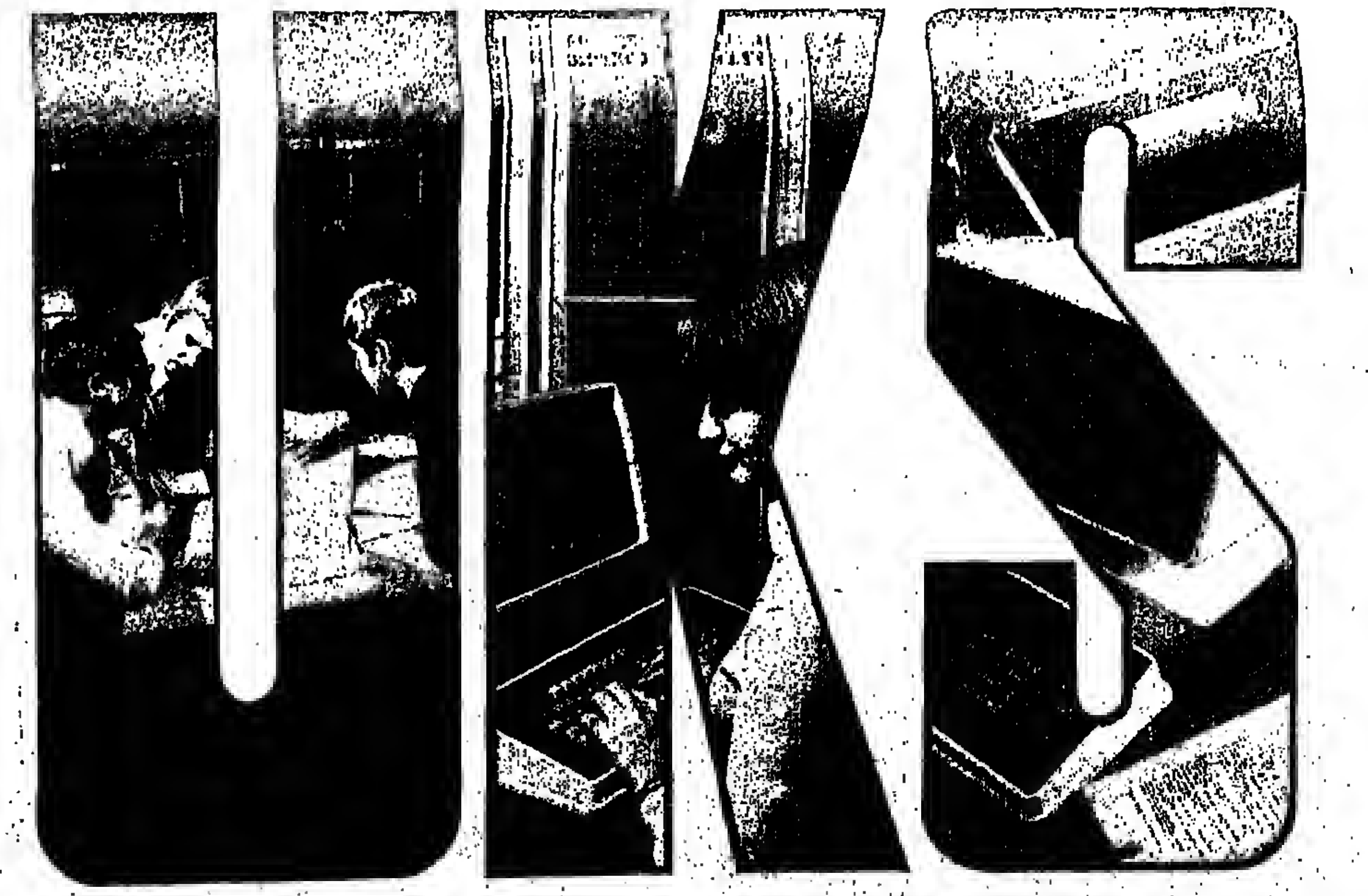

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PEOPLE AND EVENTS

By Judith Morris

Timson Curran

Nixdorf announces UK appointments

Colin Timson has been recruited as computer manager for P&O Normandy Ferries' new computer installation at Southampton. He was formerly operations support supervisor at P&O Computer Services at Rickmansworth. The computer, a Vantec 6800, will handle freight accounting to begin with.

TOGETHER with its improved service policy (CW, March 29) Nixdorf has announced the appointment of Pat Curran as UK customer engineering manager. Curran has worked for Nixdorf for the past seven years, most recently as UK engineering controller at the Hounslow head office. Prior to that he was customer engineering branch manager in Manchester. In his new position he takes over from Ulf Soller, who is returning to Germany to take up a senior engineering position in Paderborn.

Other appointments include that of Steve Gauld, who was formerly UK internal department manager and is now UK customer engineering controller. He is succeeded by Steve Bunney, who was previously responsible for technical support.

John Dransfield has become a consultant with BIS Applied Systems, based in Manchester. He has formerly specialised as a consultant in database technology at the National Computing Centre.

Gene Carter has been appointed to the newly created position of vice-president of sales with Apple Computer. He was formerly director of dealer marketing with the company. Brian Kite has joined Redifon Computers as systems analyst for British Rail branch. He was formerly senior engineer for Recognition Equipment. Peter Hjekman has become a project leader OCR, technical information organisation. He was formerly a specialist for national accounts with the company.

Mike Phillips has been appointed by H. R. Piper as sales manager. He was previously the manager of the company's printed circuit design drawing office at Brentwood.

Michael Kellner has been named by Honeywell as vice-president and general manager of the company's US computer operations marketing and services information systems division. He was previously vice-president of Honeywell's federal systems operation in Washington, and is succeeded in this position by Robert Donaldson. Donaldson was until recently director of industry and marketing for the company's US Information Systems group.

Chris Berry, general and administration manager for Systime's headquarters in Leeds has been appointed general manager of Systime's North West operation. Berry was the first data processing manager for United Drapery Stores.

Brian Hourter, formerly a salesman with Gandalf Data Communications' field service division, has been appointed to the position of sales representative for the company's Toronto region. The sales representative for British Columbia, Ross Johnson, will extend his functions in western Canada to include the province of Manitoba.

CHAIRMAN of Safe Computing, Philip Rule, listens to Cyril Smith MP at a luncheon held by the Midland Liberals, where Mr Smith expressed a pessimistic view of the future of democracy. Rule, who chaired the luncheon in Birmingham in his capacity as chairman of the Liberal Candidates Association, is at present in Canada where Safe has opened its first office outside the UK.

Norman Routledge is starting his own business as a recruitment consultant. Called Minster Management Services, the company will specialise in recruitment of management services staff, and also provide career counselling and introductory seminars for new staff. Routledge was formerly project manager in the Management Services department of ICI at Herrogate, and before that was with Rowntree-Mackintosh in the organisation and methods field. Minster Management Services is at 8a Coney Street, St Helen's Square, York. Tel: 0904 24852.

Pamela Goodman has become deputy chairman of VIP Consultants International. She is principal of Pamela Goodman Services, a subsidiary of VIP Consultants.

Award for inventor

INVENTOR of the EMIscanner, Dr Godfray Hounsfield, has received an award in the science category of the Italian "La Madonnina" awards. The award is in recognition of his contribution in the field of cerebral examination made by his invention at the computer tomography scanning technique. The presentation was made at a ceremony in Milan last month. The "La Madonnina" awards recognise exceptional achievement in many fields including philosophy, industry and literature as well as science.

CTL names director

A FORMER director of finance and administration with the Royal Borough of Kingston-upon-Thames, Roy Whithear, has been appointed to the board of Computer Technology Ltd as financial director. His experience includes ten years with IBM, where he held various managerial positions both in manufacturing and at IBM's UK head office. Whithear, who is a qualified accountant, started his career with the nationalised airlines where he was a systems analyst on early IBM computers.

David Seabrook has been appointed a senior consultant with Butler Cox. He was formerly travel systems development director with CDP. Formerly an operational research specialist with Alcan Aluminium, Nigel Harrison has been appointed as a consultant. He has also worked in the Time Sharing Division of Honeywell. Newly appointed as a consultant, Juleita Broomfield previously worked in Paris in the marketing and corporate development departments of Novotel. David Flint, formerly an analyst and team leader for the Post Office Data Administration group, has become a research consultant for the company.

Stephen Heard, formerly territory manager for Redifon in Hertfordshire and Middlesex, has become an area sales manager for the Southern branch. Other newly appointed area managers for the South include Stephen Worsfold, formerly senior territory manager, and Francis Hardie, who joined the company from Burroughs where he was zone sales manager.

James Hayt has become marketing applications engineer for Apple Computer. He was formerly a senior designer at Teledyne MEC, and has also worked as an audio visual specialist for Bell Helicopter International in Iran.

Peter Reniz has become New York regional manager for Rapidata. He, who formerly regional manager for the telephone industry with Rapidata. Jon Couch, who has been appointed southern regional manager, was formerly Atlanta district manager.

Colin Zardin has became a sales executive for Centronics. He joins the company from CDC, where he held a similar position.

Andrew Burton has joined the communications product division of Data Logic as a sales executive. He joins the firm from Logica where he held a similar position. Previously a data communications engineer with the Post Office, Bob Winch has become sales support engineer for Data Logic communications.

DIARY

APRIL 6-8
Meeting. IBM CIA operators De Vere Hotel, Coventry, NR

APRIL 6
Software engineering aspects of microprocessors in telecommunications applications. IEE. Savoy Place, WC2. 10.00.

APRIL 9
Distributed network group Glasgow branch. McCaul Strathclyde University, Glasgow

APRIL 10
Portable communications. IERE. Royal Institution, 21 Street, London W1. 10.00.
AGM. BCS Hatfield subsection, Hatfield. 19.30.
Computer audit — practice and future. B. Jenkins. BCS Computer group. Details/reservations on 01-828 9771.
Practical experience in threat analysis. L. Palmer, BCS Bradford. The Copper Inn, Pangbourne.
The computerised destruction of civilisation. B. Parsons. Science. BCS ACM group. Bessey, Uxbridge. 18.30.
Quadraphonics. BCS Newcastle. Joint meeting with the Institute of Electronic and Radio Engineers arranged.

APRIL 11
What price privacy. Institution of Electrical Engineers, Conference centre, Savoy Place, Lane, London EC2.
The cashless society. C. Cole. BCS North London branch. Westbury Hotel, Cockfosters. 19.45.
Life assurance premium collection accounting. BCS Bristol branch. St Vincent Rocks Hotel, Clifton. 19.45.
Criminal name matching. Victim. BCS Leeds branch. Polytechnic, Leeds. 18.30.
A data administration approach to performance. A. Knight. BCS Computer branch. Mountbatten building, Queen's, Mount Pleasant, Birmingham. 17.30.
Student affairs night — Freshers' meeting. BCS Belfast branch. Belfast Park Hotel, Belfast. 20.00.

APRIL 12
AGM and film evening. BCS Computer branch. Oxford Polytechnic, Headington, Oxford. 19.45.

APRIL 16
Specialised DBMS subjects. Dr O'Brien. BCS Specialist group. Chelsea College, London WC1.
Micros in action. BCS security group. Computing Club. NCC, Manchester.

APRIL 18-19
Which word processor and why. Infotech. Regent Crest Hotel, London W1. 9.30.

APRIL 18
Trade union negotiations. BCS. Waldorf Hotel, London WC2.

APRIL 19
Marconi systems. Recent developments. BCS Computer group. Guildford. 19.30.
The new information technology. South Essex College, Wardley, Basildon.

APRIL 20-22
Antiferromagnetic Hotel, Bournemouth.

DP—the first 20 years

It is hard to imagine now, but little over 20 years ago IBM had only three UK staff, there were fewer than 250 computers in Europe and magnetic tape was being hailed as "the commercial document of the future."

Those early days of the industry are recalled in the 20th anniversary issue of Computer Weekly's sister magazine, Data Processing.

One of those three IBM staff was Tom Hudson, now chairman of ICL. He tells how he worked as an IBM salesman in Canada before coming to help set up the UK operation as sales manager. Until then IBM's presence here had been no more than a marketing agreement with British Tabulating Machines. By 1958 IBM had already established itself as market leader, with 77 European installations.

British Tab's IBM marketing rights in the UK made the British company the second most successful supplier, with 36 installations.

Ferranti had 30, seven of which were Mark 1s, developed in the early 1950s with Manchester University. The others were the general purpose Pegasus and Parasus and the scientific Mercury, a "large, high-speed machine" which took 0.18 milliseconds for an addition and had 1,024 40-bit words of core.

Other manufacturers around in 1958 were Elliott and Powers-Samas, both with 24 installations, English Electric with 22 and Leo Computers with five. EMI was just bringing out the first commercially-available computer to make extensive use of core and transistors.

The 1960s brought the transistor and acceptance of magnetic tape. In 1964, IBM's 360 range marked the birth of the third generation with its integrated circuits and introduced disc storage in a big way. Around the same time came things which are commonplace today — the UK's first second-hand computer company, PL/1, the National Computing Centre and key-to-disc did not appear until 1968.

Data Processing traces the development of the industry over the last 20 years in a supplement which includes articles by Tom Hudson, David Firnberg, director of the National Computing Centre, and journalist and author Rex Malik. Details are available from the editorial offices at 79-80 Blackfriars Road, London, SE1 8HN. Tel: 01-261 8111.

A machine from the Fifties. A Ferranti Pegasus 2 which featured direct card I/O for magnetic tape stores.

French group's plans for expansion in UK

GSI UK, subsidiary of the giant French-based services group Générale de Service Informatique, has stated that by the end of next year it intends to make itself one of the top three bureaux in the UK, by equisition.

Meanwhile, GSI UK is planning to use the Post Office's Packet Switched Service, PSS, in a big way when PSS goes live, and also intends to link terminal users all over Europe to its Slough computer centre via Euronet.

GSI subsidiaries all over Europe plan to use Euronet so that the existing GSI network will not need to be significantly expanded. It will continue to be used, but mainly for high-volume remote batch communications.

GSI UK is already building up experience in working with an X25 packet switched network through its link into the Post Office's International Packet Switched Service, IPSS, its centre at Slough is the first European host to be connected to IPSS (CW, March 22).

Commenting on its UK acquisition plans, GSI UK managing director Tony Cavender told Computer Weekly that the company was particularly interested in IBM-based batch or remote batch bureaux, mainly because GSI in France was predominently IBM-based.

Asked about the availability of finance for realising the UK company's takeover plans, Cavender pointed out that GSI had recently taken over two very big Continental bureau groups — Netel in France and Seresco in Spain — with respective turnovers of $45 million and $25 million. Seresco has eight small 370s.

GSI is currently bidding for an IBM-based US bureau, Datnlab, which specialises in market research survey analysis batch processing services similar to those provided by GSI in France.

Complementing these batch services GSI UK, formerly CRC, runs interactive survey processing on its two RXDS Sigma 9 mainframes at Slough. These are the same machines that also run its network information service, commonly known until now as Cybernet. A new name for the service is to be introduced soon, to put an end to confusion with the CDC service of the same name.

GSI plans to keep the Sigmas indefinitely rather than replace them with incompatible machines, with all the attendant conversion problems. But new systems development at Slough is being concentrated on a recently installed Digital Equipment 2020 mainframe.

GSI is basing its new local computing service on the low-cost DEC 2020. This is the service intended to provide customers with complete in-house hardware/software packages that can be used by non-DP professionals.

IDPM essay competition

POTENTIAL authors of the 1979 essay competition organised by the Institute of Data Processing Management and Langton Information Systems are reminded that the closing date for entries is May 15.

The theme of this year's essay is the practical implications of distributed computer power, a topic which allows considerable scope, covering all areas and levels of computing from the micro to the large mainframe.

Essays of between 2,000 and 3,000 words are invited, and entries will be judged on originality, enterprise and practicability.

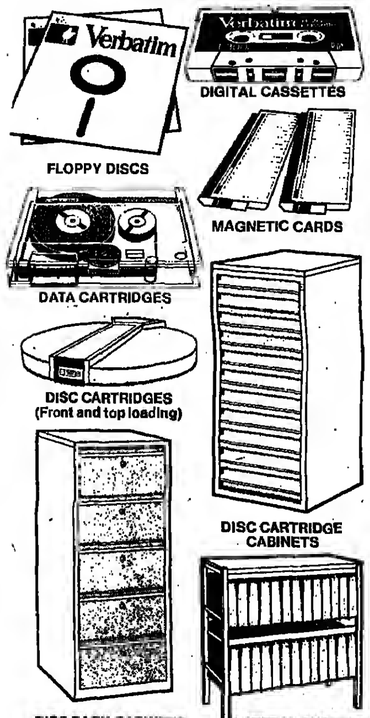
The winner will receive £300 in cash. Runners-up will also be given special prizes. Winning entries will be published in Computer Weekly.

Further information and entry forms from: IDPM/Langton Award, 12-13 Henrietta Street, London WC2E 8NU. Tel: 01-240 3304.

IBM shop

IBM has opened a shop at its Wigmore Street premises in London to sell its office equipment and supplies directly to retail customers.

magnetic media from WILLIS



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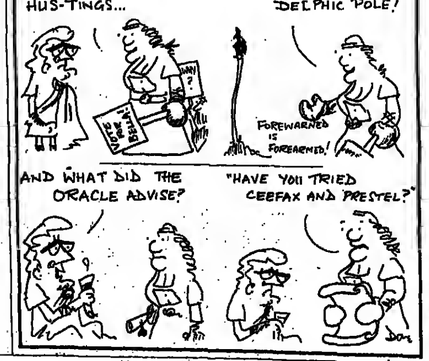

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MICRO NEWS

By Martin Banks

In-circuit emulator for 8086

ONE of the final pieces in the equipment needed to support hardware and software development on the Intel 8086 has now been introduced by the company.

This is the In-Circuit Emulator, ICE for short, which when coupled to the 8088 software development package provides full facilities for developing and debugging work.

The ICE-86 physically links an Intellec development system to the hardware under development, through a buffer box, and a cable that plugs into the microprocessor socket on the board. This connection then allows both the hardware and the software to be exercised under the control of the development system. In this way, break points can be set in the program under development, so that the detailed functions of hardware and software can be examined.

The software of the ICE also allows the user to make a symbolic references to I/O ports, memory addresses and data in the program, rather than having to work with a map of the actual machine addresses required.

The symbols can be used to reference variables, procedures, program labels and source statements, and can provide access to all of the 8088 registers and flags.

Russians catching up on the West

A STUDY carried out by the Microcircuits Division of Control Data Corp in the US has show[n] semiconductor technology in Russia is catching up fast on the dominance of Western industry. [The] division obtained a total of seven different devices from Russia for evaluation, and found [the] workmanship was "comparable to that of similar American-made devices".

The parts themselves show that the Russians are further ahead in the development of the tech[nology] than might have been considered possible, even though two of them are basically copies of [...] US-designed circuits.

These two are both memory components. One is a 4K bit RAM designed using an N-channel silicon gate process, that shows considerable similarity to the Intel 2107B memory. The other, a 16K bit RAM, uses the more complex N-channel double level polysilicon MOS process, and is a slightly modified version of the Mostek 4116E memory.

The significant parts, however, are a chip set made up of a 4-bit microprocessor, a peripheral control circuit, and a control memory. These are all produced in a CMOS metal gate process, and use a 9V power supply, which on the face of it seems odd.

Taken with the temperature specification, however, -25°C to +75°C, it seems certain that the set has been designed specifically for military applications, where wide temperature variations are found, and where the devices often have to work with large numbers of linear circuits, which have supply voltages at this level.

The micro itself seems to be a fairly crudely designed bit slice, (though it does not conform to a true bit slice architecture where virtually everything is programmable, and therefore definable by the user). There thus appear to be some restrictions in its use. It can, however, handle parallel arithmetic, logical and shift functions using 168 microcommands obtained from the control memory device. It has two 4-bit bi-directional I/O registers, and one 4-bit bi-directional condition register.

Like conventional bit slices, the micro can be connected in parallel to form processors of 8, 12, 16 bits etc, working [...] acknowledge/not acknowl[edge] interchange of data on [a com]mon bus.

The control memory [...] to be available in five [...] according to the report [...] variant is a mask progr[ammable] ROM, and though there [...] supporting data availa[ble from] CDC on the devices, it [is] certain that their functio[ns] hold the microcommand [in]struction set for the [...] processor.

The final member of the set, the peripheral contr[oller] used to organise the [...] extra-processor perip[heral] sequential data exch[ange] according to the report [...] also be used for interfac[ing as] well as controlling peri[pheral] devices.

Industry sources have [indi]cated that the capabilities [the] Russians have come as [a] surprise to the US gover[nment]. Though it was to be ex[pected] that copies of [...] designed products [would be] made, given that [...] materials processing [...] is known to be good, the [fact] that internally generated [...] has progressed far en[ough to] produce a microprocessor [has] apparently raised some [eye]brows. There is even [...] speculation that the desig[n is in] fact the work of the East [Ger]mans, rather than the Ru[ssians].

Despite this, the Russians [are] now seen as being able to [follow] Western developments [more] closely than was expect[ed] though still being some [way] from the leading edge. [For] example, where US comp[anies] now manufacture using [...] micron geometries, the Rus[sians] have got down to 5 micron[s].

Spelling aid from TI

THE fascination children [have for] pushing buttons that light [up], plus an interesting way of lear[ning] new things, have again been coupled together by Texas In[s]truments in this new educational "toy", called Spelling B.

This micro-based unit [...] store the spelling for 284 wo[rds] each of which is depicted graphi[c]ally in the pages of an accompa[nying] book. In use, Spelling [B] selects and displays the num[ber] of a page in the book, and the child has to recognise the picture and spell out the word on the calculator-like alphabetic key[board]. At the end of each word [it] comes back with either "right" [or] "wrong", and after two wrong [spel]lings, the correct [...] played.

US oil company could take over Abacus

THERE is considerable speculation at the moment that Abacus Computers, the Texas Electronic Instruments and Compucolor distributor, is to be bought out by an as yet un-named US oil company, which has plans to develop Abacus into a European operation.

Abacus managing director Derek Rawe declined to comment on the speculation, but industry sources are suggesting that several million dol[la]rs could be invested in the development of the company. [It] is also said that a key part [of the] development program[me ...] new range of computers [...] sold by Abacus. This [...] Data General based [...] equipped with 10 Mbytes [...] disc storage.

Though the pricing [...] new system is being [...] "aggressive" [...]

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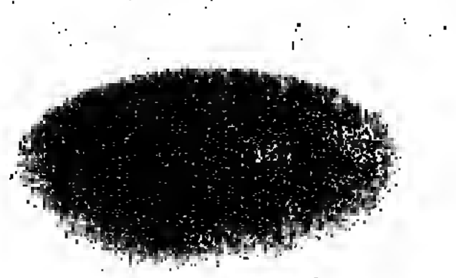

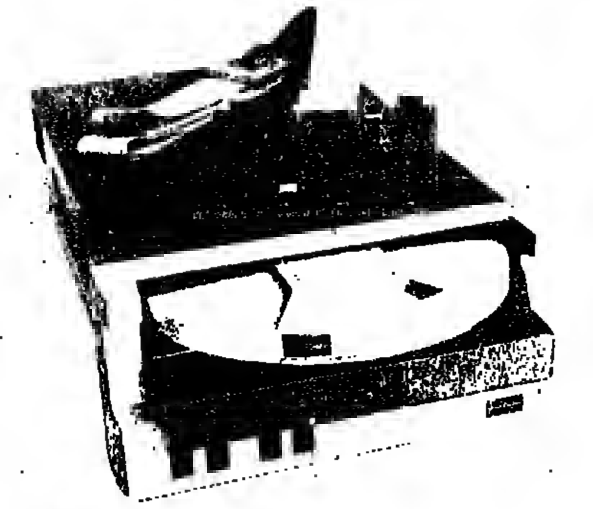

The manufacturer doesn't:

The old RK05 was recently replaced by the new RL01, and as disc drives go, the price is nice.

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Supporting our customers with the right products, prices and deliveries has made us the largest independent supplier of LSI-11, PDP-8 and PDP-11 compatible peripherals. Our product line presently includes add-in/add-on core and semiconductor memories, cartridge disc systems, floppy disc systems, mag tape systems, complete computer-based systems, and a wide variety of backplanes, expansion chassis and other accessories.

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Equipment makers show steady growth—report

COMPUTER equipment manufacturers in the UK have been enjoying steady and continuing growth. According to a report produced by ICC Business Ratios* in which the accounts of 60 leading UK computer equipment manufacturers are analysed, total sales increased by 58% between 1975 and 1978 producing a before-tax profit increase of 95%.

One of the fastest growing companies analysed was the EMI group company, SE Labs, whose sales jumped from £4.6 million in 1975/76 to £23 million in 1977/78. Its profit margins, profit before tax divided by sales, also rocketed from 1.9% to 23.9%.

In terms of return on assets the growth is equally remarkable. Total assets in 1975/76 were £4.3 million and had grown to £11 million by 1977/78. This resulted in a jump in the return on assets from 2% to 49.5%.

Dealing with ICL, the report indicates that the company's sales and profits have shown a steady climb. During 1977/78 the company made £30.3 million profit before tax on sales of £418.6 million. Profit margins have remained steady at between 7 and 8%.

The company's debt collection period has averaged about 90 days while IBM has kept its down to 39 days. However, some companies, such as Datasaab and Tesdata, were giving, on average, over 180 days to their customers.

IBM UK led the field with a before-tax profit rise from £72.3 million in 1975/76 to £110.3 million in 1977/78. Its profit margins also increased to about 19%. Only two companies have recorded higher margins, one was SE Labs with its 23.9% on sales of £23 million, and the other was Trend Communications, of High Wycombe, with 22.9% on £2.4 million sales (1977/78 figures).

An analysis of IBM World Trade by New York stockbrokers, Dean Witter Reynolds, observed that while the UK operations in 1977 only produced 3% of the company's total revenue, the margin was well below the World Trade average of 30%. As UK labour costs are considered as being very low, a half of Italy's and a third of West Germany's, the 19% margin was questioned. The stockbrokers suggest that some of the missing profit "may have been pocketed by IBM Germany, from which, among others, IBM UK imports."

Burroughs is the third largest company in terms of sales analysed by ICC. It managed to turn a £2.3 million loss in 1976/77 into a £13.1 million before-tax profit during 1977/78. The increase in sales during these years was less than a million pounds, reaching a total of £98 million in 1977/78. The company reduced its labour force from 5,715 to 5,243 and the average wages increased from £3,311 to £3,883.

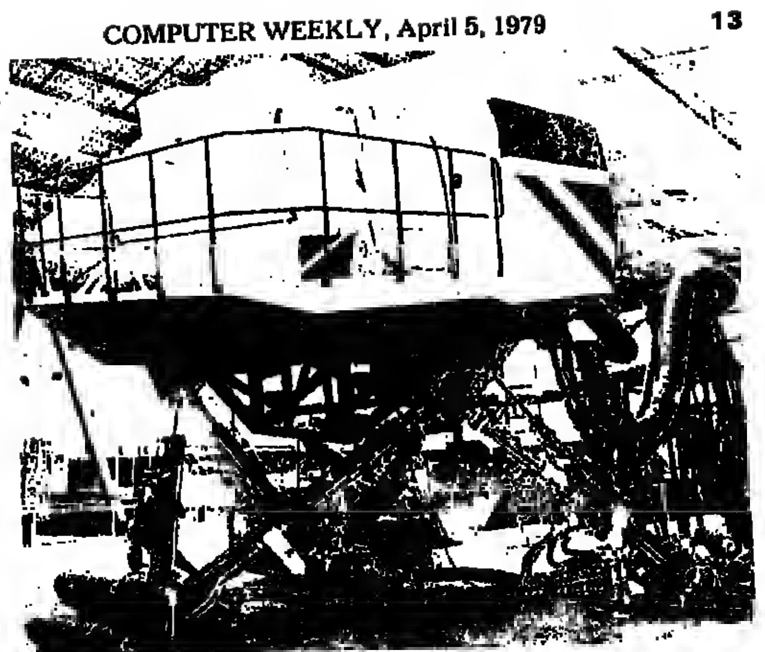
During 1977/78, total sales of the sample firms in the ICC survey increased by just over 20% to £1,574 million, of which 36.8% was IBM and 26.6% ICL.

Of the 47 firms for which 1977/78 data was available, 45 increased their sales. Only seven of the 47 firms recorded a loss, the largest being £1.1 million by Nixdorf Computer.

The majority of companies analysed were rapidly increasing their stocks and debtors, often out of proportion to their increase in sales. Credit periods were getting longer and stocks larger.

Taking into account the pace of technological change, there appears to be a possibility of some companies being at risk in holding obsolescent stocks. When this is added to the granting of longer credit periods these companies may be heading towards a cash crisis if they cannot adapt quickly to market changes. Thus while the industry is healthy and the market is expanding, there are indications that some companies are at risk.

*ICC Business Ratios — Computer Equipment, 18 City Road, London EC1 [...]44.



TWO Sikorsky S61-N helicopter simulators, the first designed for training commercial pilots, have been produced by Redifon Simulation; one for British Airways and the other for Helikopter Service A/S of Norway.

The BS simulator has already been installed at the company's helicopter training operations building at Dyce Airport, Aberdeen, while the Helikopter Service equipment is still being installed at Forus Airport, Stavanger.

The flight decks are exact replicas of the real aircraft, and the apparent "window views" are produced by a Novoview SP1 night-dusk computer-generated image visual system, which is based on a Texas Instruments 9900 mini. This allows over 6,000 light points and up to 200 shaded surfaces to provide airport scenes which include horizons, sky, buildings, and terrain and landing lights. And just in case, Redifon have included a facsimile oil platform model.

All major simulator functions are co-ordinated by a Redifon 2000A computer which interfaces with trainee pilots through a control loading system which is said to provide the "feel" of a Sikorsky S61-N, while audio and hydraulic equipment add realism.

Finance proposals for small businesses

FINANCE could be more easily available to small businesses if proposals in the interim report* of the Wilson Committee on the workings of the City are adopted.

The main recommendations are for the setting up of Small Firm Investment Companies, and a government backed loan guarantee scheme. The SFICs would be similar to unit trusts and would provide a link between the investing public and small businesses. Investors who buy shares in an SFIC will be able to gain special personal tax relief, and the companies will use their funds to buy shares in small businesses.

Initial reaction of some small operations in the computer industry was not very favourable. Mike Sterland, a director of Apple's UK distributor, Personal Computers, whose business turnover is approaching £800,000, said, "It is a useless recommendation, you may not be able to buy back the shares," and Mike O'Regan, a director of Research Machines, preferred not to sell shares because he believed it gave the buyer the right to interfere with his business decisions.

The alternative proposal for small companies to get finance from the clearing banks using a government backed loan guarantee scheme appeared to be more acceptable. However, a warning was sounded by the Industrial Commercial and Finance Corp. It believes that large loans could create financial problems for some small companies which may find difficulty in meeting the loan repayment conditions.

ICFC suggests that it is better for small companies to plan long-term finance by using shares and loans.

The Wilson Report made 20 recommendations in all, including a proposal for an English Development Agency similar to the Small Business Divisions of the Scottish and Welsh Development Agencies.

*The Financing of Small Firms, Interim Report of the Committee to Review the Functioning of Financial Institutions. HMSO £1.75.

UK marketing deal

INTELLIGENT disc controllers for Digital Equipment, IBM Series 1, Data General Nova, Hewlett-Packard 3000 and Interdata computers are now being marketed by MSC Microcomputers (Europe) Ltd.

Micro standards

SOFTWARE engineering standards for microprocessors in telecommunications applications is the subject of a conference to be held at the IEE, Savoy Place, London tomorrow (Friday).

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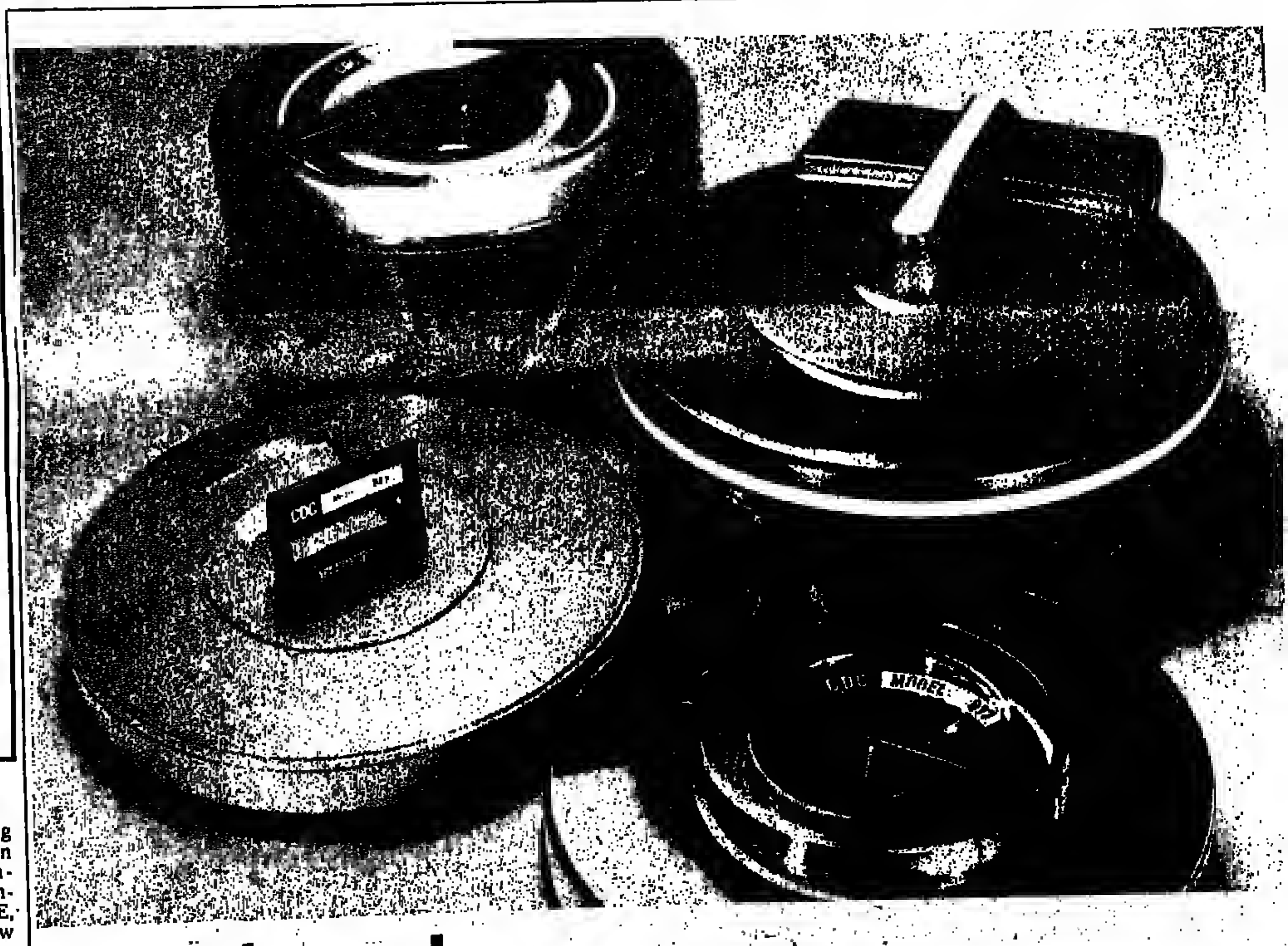

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More than a Computer Company

Why ops rooms need better equipment

Accessories and ancillaries usually have a low priority in the DP budget in most installations.

In this feature, our own Focus columnist tilts at this complacency and points out that even small improvements in the rest room can generate considerable rewards.

By Focus

THE world of acceaaories and ancillaries is one which seldom gets the attention and exposure it deserves. This all too typical practice of sweeping the subjact under the nearest loose floor pancl, however, is not to be recommended.

The elinilnstion of all possible software bugs is to little avail if the dust bug is allowed to roam freely within the machine room.

Damage from spiking is not limited to computer room floors from stiletto heels. Power fluctuations can put paid to a lengthy processing run as easily as an air-conditioning plant shut-down.

As Bernard Allen, the Computer Weakly resident Op Spot, would no doubt agree, the initiol layout and daslgn of the computer room is as important as the choice of operating system. Not all ops are of John Tmvolta type dimensions and flexibility.

Bernard Allen would alao very probably endorse the typical budgeting facts of DP life. When costing the new system, DP management make generoua allowances for both mainframe and software. Thia allowance could well be in the region of plus 20-45%.

But when it comes to ordering that much needed replacement burater/decollater, such cost flexibility disappears. After much debate, discussion and reflection, approval is granted to purchase the standard model — the de luxe model being ruled very much out of court.

Also out of court and sight are such items as tape and diac rachs. Such equioment aa is in current use was probably the pride and joy of earlier ICT installations and should have been pensioned off aeveral decades ago.

There would seem to be scope in this region for some enterpriaing memory manufacturer to offer some fringe benefita. With each Storage Technology label top, a new disc cabinet will be supplied.

Very often a visit to the computer inatallation is equivalent to a trip back in time. Amidst the gleaming mainframe leans a dejected operator's chair, battered trolley and waste bin which itself should have been consigned to the corporation waste dump.

The false floor also boasts s false surface — several layers of congealed grease and grime from earlier generotions of chain-driven line printers and CPUs.

Even so, the environment of the computer room is often admirable when compared to the remainder of the inatallation. Behind every computer room lurks a plant room.

Here one can view a collection of old ond redundant machinery which would be a pride of any science muaeum. Sorting machinas nudge taps apiicera, both no doubt baing preserved by earlier breeds of DPMa just in caae.

The "just in case" selcetion includes boxes of multi-colnured punch cards and files stratching back to NCR 500 visible record computar daya.

Amidst tha general clutter are aited the vital elements of the computer inatallation — power aupplies, air conditioning and humidity controla and fira detection apparatus. Not far away should be the stand-by ganerator.

All too often though, standing-by any of this assorted gear is o toak requiring much in the way of agility and torches. It is an area where even the most liberated female would be loth to visit without adequate protection.

Equally unstructured is the site atore room. Here, random access is tha acknowledged retrieval mode. First in, last out is ths operating system.

Structural analysis la a aeries of aturdy boxas enabling the more agile — or nubile — operators to climb to dizzy heights. Inventory control, is very much more theory than practice.

Should the DPM evar find himself with a spare segment of time, much value could be obtained by organising a session with the site engineers, senior operators, librarian and claaners.

Topics for the agenda could well include:

- Headcrashes. Not all headcrashes are caused by careless handling or vibration. Dust particlea have a noted affinity with the beat maintalned disc drives. Elimination of both threats are to be encouraged. Regular servicing of both drives and media should be as routine as that of air conditioning trunking.
- Records. A regular compilation and indexing of all records is advisable. Files, surplus to immediate requirements, should be consigned to the off-site storage care of such security warehouaes as Safestore in Greenwich.
- Cleaning. Cleaning operatives ahould be instructed to treat all equipment with respect. Washing down the CPU with detergent soap may be only a minute's work. The subsequent reclamation period will be more prolonged.
- Stationery. A full-scale reappraisal of all atationery supplies and suppliers should be triggered. The current tendency to use multi-purpose printed stationery should be encouraged. The continuul changing of pre-printed forms on the line printer is a continuous operating cost factor. Likewise, buying in bulk at a competitive price could well prove to be the week's good cause.

There, are of course, many othar areas which require the care and attention of the DPM, not least that of aecurity.

With the findings of the long gestating Data Protection Committee only recently released, computer management will hove to give much more attention to protecting data—both inside and outside the company memory banks.

Perhaps as a diract consequence of tha emphasia of recent privacy diacussions, there has bean a noticeable alackening of security messages.

Not so long ago, the diligent NCC aecurity team saw fit to pronounce on each and every security hozard, at considerable length. Now it oppears that the unit hoa shut itself securely away from the security action.

Likewiae, the Computer Users Year Book — the one-volume industry reference baznar — has seen fit to omit its regular security section.

Such non-action la regrettable. Vigilance and determination is avor more necessory, given the vulnerability of mony computing systems.

The DP installation muat be made safe from sundry marauding vandale, terrorists and sabotaurs from the outside, and deliberate aggro from the inside.

Each and every DP installation, as was recently recommended by a speaker at an Institute of Data Procesaing Managament meating, should appoint a security officer to be responsible for all levels of environmental security.

One such level should be fire and smoke detection. It is important however not to get too carried away with fire prevention measures: false alarms could be as expensive in terms of cleaning-up as the real thing.

Communication also plays an important role. Rather than letting his fingers do the telephone walking, the DPM often finds it is quicker to jog around the installation in order to discover the current state of play.

A direct communication link between DPM, control and ops room should be as standard as the modem interface to the factory floor and warehouse.

Unfortunately, environmental improvements are not likely to feature until such time as DPMs are appointed with an operating background.

Should the systems team require a new programmable desk-top calculator, the authorisation is given without delay. Should the programming department require more comfortable chairs, then they have only to ask.

Should however the ops manager hesitantly request a new work scheduling chart, a full-scale inquest will be held.

What, it may well be asked, is wrong with the existing system of coloured memo cards? In any case, a wall-chart would only confuse the data preparation supervisor.

Additionally, space would have to be found for the BASF calendar and NCR Snoopy print-out plus the safe key peg.

All too often ancillaries and accessories are the last in the DP line. Resources are only grudgingly conceded. Preference is given to making-do and mending rather than replacement.

Tape, string and glue are standard tools of the trade. It is certainly about time that fresh light and attention was cast into the long neglected corridors of power.

Meanwhile a start can be made on the installation rest room. Very often a relic of earlier times, this is one area where a little thought, time and expense will generate considerable rewards.

After all, it is hard to promote hearty grievances from the depths of a comfortable chair with vending machine and copy of Computer Weakly close to hand.

Users' charter to end users' nightmare call

AS access to computer terminals is extending further into all aspects of business and organisational structuras, new challenges to the systams designer arise. Will we see the future as a users' charter or a users' nightmare? This was one of many questions asked at a meeting of the BCS Special Interest Group on Human Aspects of Computing.

[illegible] of the Human Sciences and Advanced Technology Research Group at Loughborough University, believes that the success of a computer system is limited to the evaluation of the system by its direct users. A user for whom the technical alegance of a systam may be of little interest will evaluate it in terms of its accuracy, relevance to his task, ease of use and the quality of user support.

Damodasan sees the potential flexibility of distributed processing as contributing to a new era of systems, designed in accordance with a users' charter. [illegible] would be custom-designed for the non-professional user or user group. Complex software would provide simplicity of oporation.

A deliberate decision by systems designers was required if the alternative, the "users' nightmare", were to be avoided.

Larry Farrow, National Computing Centre, examined the ways in which small and medium size business [illegible] are used, not used or misused. The key to system use is not [illegible] the incorporation of human factors and effects [illegible]

Tories pl[...] Informati[...] Minister

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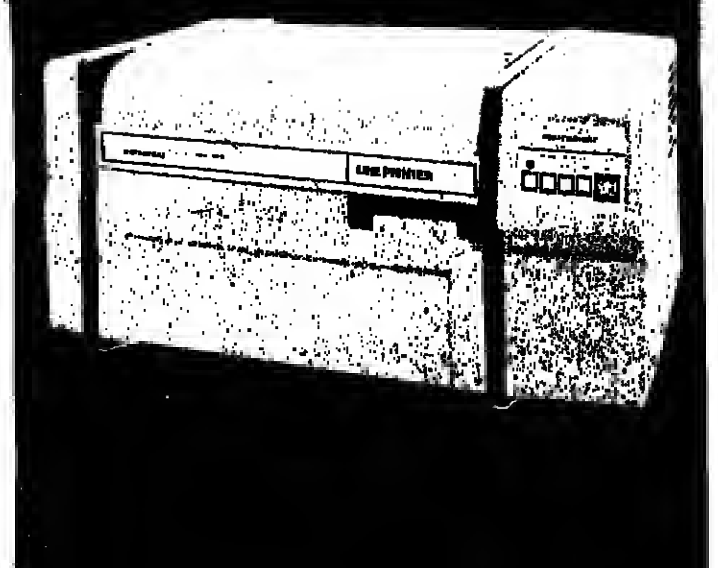

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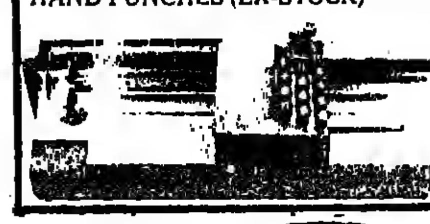

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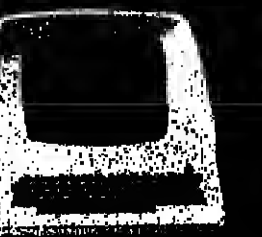

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Products for removing TSO functions

I HAVE been attempting to discover whether there exist any products for removing certain TSO functions from IBM mainframes.

To date I have found only a system offered in the US which is a front-end processor with terminals connected locally. Our situation is that we have about 80 terminals in some 30 widely scattered locations.

Many of the functions wired out at terminals are trivial (eg file editing) and do not require the power of a mainframe. There appears to be scope for distributing file storage and processing power, thus reducing costs and response time, but increasing the availability of local functions wherever the central service was unavailable.

B. T. JOHNSON
Manager, Advanced Systems Technology
Leyland Cars,
Redditch.

LETTERS

To: The Editor, Computer Weekly,
Dorset House, Stamford Street, London SE1 9LU

Standards of construction

IN his article on microcomputer bus standardisation (CW, February 22) Richard Stevens criticised some UK-manufactured computer systems, saying that the standard of construction "often leaves a lot to be desired!"

As there are very few UK personal computer systems, this might seem to be passing comment on the construction of the Research Machines 380Z. If that inference is taken, I think that experience shows it to be particularly undeserved.

I hope that another extract from the same issue supports my view. Brian Smith, in an article on computers and art, wrote, "The present writer actually trundles a Research Machines 380Z around to art colleges in London and Canterbury, pulling it through the slush on an adapted luggage trolley with no ill-effects".

In defence of other all-British non-kit personal computers, we have heard only positive comments about their standard of construction.

I would also like to take issue with Richard Stevens over the S-100 bus. One of several reasons for us not to adopt the structure when we designed the 380Z was the poor reliability and robustness of edge connectors and motherboards, something the general electronics industry is becoming increasingly aware of.

MIKE O'REGAN,
Director
Research Machines.

Sick joke to the 1.4 million jobless

YOUR Computerview, "Catch-22 for the employer" (CW, March 22), was an excellent example of the complacency and rationale which the APEX report on office technology sets out to combat.

The notion that "market forces" will automatically lead to full employment of workers displaced by new technology is a sick joke to the 1.4 million people currently unemployed.

The report further points out that there need to be an additional 1-2 million jobs created in the next five years simply to keep unemployment at the present unacceptably high level. The Arthur D. Little organisation recently forecast 1 million extra jobs being created by microprocessors (and totally neglected all those jobs lost due to their application) in *all* advanced industrial countries — or at most round about 10,000 a year in the UK. This certainly is far removed from the irrationally optimistic tone of your editorial.

The APEX report does not argue for rigidity of employment in every company. It *does* question the assumption of many employers, and explicitly accepted by your writer, that productivity increases mean "fewer people are required to provide the same service". Instead we argue for *expanding* the goods and services available while maintaining employment levels and reducing the working week and life.

APEX explicitly recognises that industries and jobs are constantly changing. Instead, however, of accepting this as uncontrollable, we lay down detailed recommendations, including retraining, to ensure that working people harness the potential benefits.

APEX argues that microprocessor applications will have a dramatic effect on offices within the next 5-10 years. The reasons for this supposedly "dubious assumption" are spelt out — the technology is already on the market, the office sector is comparatively under-capitalised and labour intensive, and a "completely automated factory" is impracticable at the moment in most branches of industry. The quantity of sheer routine work done by clerical workers, relative to those who "do creative thought" (sic), is substantial.

Contrary to widespread belief, reiterated in your editorial, there is no great excess of jobs for clerical workers or even typists and secretaries. The quoted 26,000 typists' vacancies in London in no way square with DoE figures and, in any case, no mention is made of the numbers seeking these jobs. Even in the South East the picture is far from rosy with three unemployed clerical workers for every unfilled vacancy at employment offices in December 1978. The assertion that the supposed London shortage is paralleled in other cities is totally unjustified. In the West Midlands there are nine registered unemployed clerical workers for every vacancy and this situation is repeated in many other areas. Unemployment among clerical workers is rising at a faster pace than among manual workers — a 68% increase in the last five years compared to 33% overall.

The fear expressed that APEX policies will imbalance "the public sector" is, we are delighted to report, magnificently irrelevant, as 90% of APEX members are in private industry.

In closing, APEX expresses its appreciation for your lengthy reaffirmation of the very philosophy APEX seeks to counter. Trade unionism among DP staff can only accelerate as a result.

ROY A. GRANTHAM
General Secretary
APEX,
London.

The figure from Arthur D. Little of 1 million extra jobs is net — that is the surplus of new jobs created over those lost. — Editor.

Benefits of office automation must be shared

AS a member of the APEX Working Party on Word Processing, I would like to reply (in a personal capacity) to the Computerview headed "Catch-22 for the employer" (CW, March 22) on our first report, "Office Technology — the Trade Union Response".

As Janus is the guardian of doors and gates, a Janus-like stance seems most apt for a trade union as we enter the office of the future. A trade union needs to look to the future while not forgetting the past.

More seriously, our view that the benefits of office automation should be shared between employer and employees seems to have eluded you. The Manpower Services Commission recently pointed out that a large number of young people are about to enter the job market. The MSC estimates that some 1.2 million new jobs will be needed by 1982 merely to maintain the present high levels of unemployment. The benefits of office automation must be equitably shared, if serious social unrest is to be averted in the 1980s.

Your definition of the fundamental nature of technical progress, ie fewer people providing the same level of output, is not the only definition. Alternative definitions include the same number of people producing more, or instead a larger number working shorter hours to provide the same level of output.

You assert that a prerequisite of improved productivity is that people have to change their jobs. Ignoring the implicit assumption of there being alternative jobs, there are some practical difficulties for office workers changing their jobs.

These arise from the average level of earnings of clerical workers and the awkwardness of moving one's house speedily. Just over half of APEX members and some three-quarters of clerical employees are women, and average female earnings are still only about 70% of average male earnings. In the case of couples the woman's income is therefore likely to be the secondary income.

If the alternative work is not within commuting distance of their present home, the alternative work remains beyond the reach of the displaced female worker. About a third of working women with children are sole breadwinners. While they may not be tied by a partner's job to a particular place, can they readily move?

It is difficult for low income workers to move because of the need to swap homes if in council property, or because of the sharp regional differences in property values if an owner-occupier. In addition, they are unlikely to have much in the way of savings.

Your remarks about employee participation in systems design are rather strange, as Computer Weekly recently ran a five-part series advocating effectively this (Participative systems design, November 9 to December 1, 1978).

Employees have much to contribute to the design process in the computerisation of existing functions. After all, they have the best knowledge of both the problems of the formal system and the actualities of the informal system.

Last year's BCS User Survey showed that systems designed to the satisfaction of end users are the exception rather than the norm. Clearly, participative systems design methods are more likely to come up with workable and efficient systems than is management [illegible]

[illegible]
London.

Straight talking to all DP managers

Managing DP staff and resources successfully takes a highly skilled person. The job requires: planning, control, interviewing, supervising staff and problem-solving skills, among others; knowledge of DP alone is not enough. For too many managers the training and development needs of their staff take priority over their own personal development which means they have to acquire these skills the hard way – through trial and error. A slow and wasteful process.

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Advertisers Announcement

PERKIN-ELMER
DATA SYSTEMS NEWS ISSUE NO 3

Transaction processing - a new dimension

As business data processing moves into the 80's the current emphasis is on computing flexibility.

This is being achieved by a fast growing trend towards distributed data processing environments. These allow computer users to place workstations at strategic locations throughout their business and to process several different tasks simultaneously whilst sharing common data.

This facility is provided by a sophisticated transaction processor linked to an efficient data management system and operating under the supervision of a transparent communications manager.

This trend is being further enhanced by the growing dominance of the minicomputer based upon a combination of increasing capability and decreasing cost.

Perkin-Elmer, with their range of well established business systems providing advanced multi-user, multi-function facilities, are one of the leaders in this data processing revolution.

Perkin-Elmer's transaction processor reacts to the input of data in a way previously only available on large mainframe systems at enormous cost and at a high machine overhead.

In this new environment it is the data which determines the application module required to process the message submitted from a local or remote workstation.

This provides a business with great flexibility in that the response to data entered is directed to the source of that data and the entire system functions as a real-time data bank for the business providing management with critical decision making information instantly. Transaction processing lends itself ideally to the solution of business problems, such as in the distribution industry, where tight inventory control and cash collection must be matched to a fast and efficient order processing function.

The low cost of these Perkin-Elmer systems now brings these benefits within the reach of all companies where traditional methods are stifling growth.

User Group

Now in its seventh year, Interchange, the User Group of Perkin-Elmer Data Systems in the UK, continues to flourish.

The Group meets quarterly in London for user presentations, Company product announcements and in depth technical presentations. It is run by a committee of users who decide agendas and issue a regular newsletter.

Perkin-Elmer is represented at all meetings by the Chief Executive and the UK Support Manager.

Record Corporate results

Record sales and profits have been reported by the Perkin-Elmer Corporation for both the second quarter and six months periods of its 1979 fiscal year.

Sales for the second quarter ended January 31 were $176,932,000, a 29 percent increase over sales of $329,241,000 in the second quarter a year ago.

Sales for the six months totalled $129,215,000, a 30 percent gain over last year's six months sales of $252,808,000.

Net income for the six months was $21,621,000 and was equivalent to $1.09 per share. This was 69 percent above the net income of $12,794,000, equivalent to 65 cents a share for the first half last year.

Robert H. Sorensen, President and Chief Executive Officer, said that each of the Company's five business units contributed to sales and profit growth with continued strong market demand for its products.

Production Control on-line at DJB

The growth of articulated dump truck manufacturer DJB Engineering Limited has been remarkable. Since May 1973 founder David Brown and his team have built DJB into a company with an annual turnover in excess of £20 million, most of which is from export.

Of course, growth at this stupendous rate has not been achieved painlessly but dogged persistence, marketing flair and attention to tight financial and production control have paid off. These characteristics were considerably reinforced by the Company's acquisition of a highly sophisticated computerised information system based on a Perkin-Elmer minicomputer, which provides managers at all levels with day-to-day information vital to the continued success of the business operation.

FUTURE EXPANSION

Design and implementation of the system was entrusted to Tripont Associated Systems Consultants, a systems house selected by DJB from a number of candidates, including several major computer manufacturers. With a brief for a system starting with a modest investment but with full scope for future expansion, Tripont specified two Perkin-Elmer 7/32 processors with disc store, Video displays, card reader and printer.

DATABASE

What we have, says DP supervisor E. Comer, "is a central database holding details ranging from customer account balances to forward orders, stock items and parts explosion lists."

DJB managers are able to dip into this database at the touch of a button to extract accurate, up-to-the-minute information on which to base decisions. This permits tight control of the whole process from taking the initial order to specifying components, building the truck, delivering it and receiving payment.

Beaver is hard worker

Newly announced Perkin-Elmer Beaver is the first intelligent terminal specifically designed to be incorporated into customised, intelligent workstations. There are three independent hardware modules - CRT display, keyboard and an electronics module which can accommodate one or two optional floppy disc drives. These modules can be placed exactly where they make sense for the application. Beaver comes with a comprehensive package of high-level, field-proven software and dozens of options. The Perkin-Elmer Terminals Operating System (PETOS) creates a friendly environment for the user with communication between operator and system in plain, simple English. A complete package of quantity discounts, service and support is available to OEM's.

No language barrier at Oxford

Present and future facilities for research in computer programming at Oxford University have been greatly enhanced by the recent installation of a Perkin-Elmer 8/32 Minicomputer and associated hardware.

The Program Research Group of the Oxford University Computing Laboratory holds a Science Research Council grant in software engineering. Through basic research into the theory of programming languages and methods, a major aim is to reduce the cost of computer programming, to match the reducing cost of hardware, by publishing programs of high quality and general usefulness in such areas as process control, word processing, laboratory automation and data bases for small scale workstation applications and ultimately even personal computing.

HIGH-LEVEL LANGUAGE

For much of this work, the Group has, until recently, been dependent on a 16-bit system installed some ten years ago. All software for this machine was written in a high-level language, BCPL, and was run using interpretative techniques. In choosing a replacement, the Group wished to overcome the addressing limitations of the 16-bit system and the speed penalties of interpretation. Future expansion potential was also an important consideration.

WRITABLE CONTROL STORE

With a modest grant for the replacement (less than the cost of the original system), the options were examined. Final choice was for a Perkin-Elmer 8/32 processor with 256 KB of memory, two 67 MB discs, magnetic tape and a line printer. This configuration more than fully met the requirement within the available budget and the decision was strongly influenced by the Perkin-Elmer Writable Control Store, which is user-microprogrammable. At Oxford, WCS replaced the interpreter and allowed continued use of the existing operating system with dramatic improvement in speed. No additional software was needed.

Since installation in June last year, the system has, to quote Professor Hoare, proved to be "fast and reliable", and, of course, offers scope for the considerable expansion which he envisages in the future.

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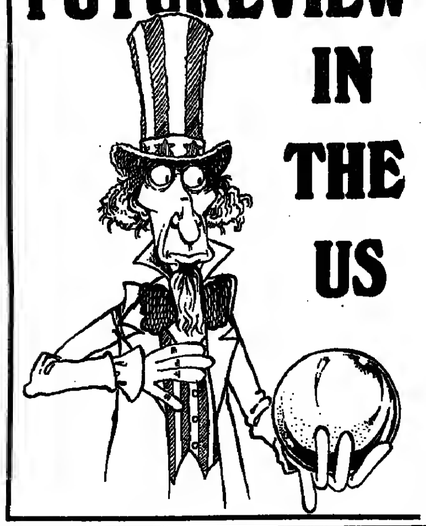
FUTUREVIEW IN THE US



Electronic ghosts, the merging of human and non-human minds, and the devastating power of information mishandled, simpe much of this, the third of our five-part series Futureview in the US.

Talking to Futureview Editor ROBIN WEBSTER, the US science fiction author NORMAN SPINRAD discusses the world of tomorrow with much attention to the political aspects of control by technology. Pondering the electronic wonders to come, he does not forget the darker side of their application.

Many of Spinrad's novels have a prominent political theme and among these are Men in the Jungle[1], which deals with a drug-ridden alien race that survives by cannibalism of the young who are bred and herded in government camps; and The World Between[2], which tells the tale of two groups fighting for control of the media channels on earth, which is the media hub of the galaxy, under a government that controls mining and energy production for profit.

The final two parts of the series will feature Lester del Rey and Fred Pohl.

Merging the 'minds' of Man and machines

ONE of the most enigmatic devices known to man is his own brain. Mysterious zones still exist within the mind, and while it is uncertain whether the interactions within are pure and simple, complexly holographic, or based on a yet to be discovered process, the device works.

Compared to a computer though, the organic mattar of the brain fails to match the near light-speed switchings of electronic circuits, and so its data handling capabilities in the strict sense are limited.

Norman Spinrad, the US science fiction writer has, however, suggested a method of merging the "minds" of machines and men.

"If you have a computer access terminal wired into you soon after birth, where you can interface with a computer network, then your consciousness is going to be intimately involved with the computer's consciousness," he said.

"When you have a complicated maths problem, theoretically, given a high enough technological level, you will start thinking out the problem in your protoplasmic brain and at that point the implant will key into the computer and the computer's calculating aspects and databank information will appear in your mind.

"A world with this sort of event taking place will be a very free society because they are controlling the machines — it's very individualistic. On the other hand, with a different political orientation, with the same hardware, you can put implants in people's heads to make everybody think alike. You could even go beyond this and create a 'hive consciousness,' like an anthill or beehive, where individuals are only components of the society.

"I don't think that any of these things are inherent in the technology itself, it's what people do with it."

SPINRAD: "In the future, technology becomes the slave and everybody is the master . . ."

And among these "people" could have been one of the most sinister and frightening figures this or any century has seen, as Spinrad explains.

"Just imagine Hitler had access to the current technology with regard to television and computers," he said. "What he would have done with it would have been to make Nozi Germany even more efficient and horrific than it was. If he had been able to use the 'tube' instead of just radio and mass rallies, it wouldn't have taken him so long to take over Germany.

"He could have done it in a 13-week TV season. Thirteen parts and he probably wouldn't have been cancelled after six weeks!"

People's uniqueness would have been used against them too.

"Instead of everybody carrying a pass book, if their retina patterns were just keyed into a databank, all that would have to be done would be to catch somebody and photograph their retinas. You radio this to the computer and then you would get everything you needed to know about them. You wouldn't have to have anything else, it would all be in the computer."

One example of technology that could be used in dubious political ends is Qube, the computer-based cable television system in Ohio that allows the viewer to respond in real time to questions screened during programmes (CW, August 10, 1978).

While today the viewer selects a beauty queen or drums off his least favourite act in neo-vaudeville style, tomorrow he will be casting his political fate or participating in a mass opinion poll, maybe under the sole influence of Walter Cronkite or Daffy Duck, as speculated by Ben Bova in the first of his series (Futureview October 5, 1978).

"With Qube you can have a box on your set with seven buttons by means of which you can give one of a number of responses," he explained. "Right now they are using it mainly for market research, instant programme ratings and things like that, but there's no reason it can't be used for voting for instance. Instant electronic plebiscites for the election of representatives.

What would the ramifications of this be?

"It will have drastic political effects," replied Spinrad. "It can have a political campaign for example, which can see to be that each candidate will have channel full-time to do what they want, and there is instantaneous electronic voting by means."

Maybe this would cause a source of control to gravitate into the possession of the people instead of leaving it with government.

"Well, if you see that kind of hardware in a democratic context, where the goal is to try to make things more democratic, I think it diffuses power," he said. "Apply the same hardware to a totalitarian state and you have a very, very heavy mind control."

Despite this spectre, Spinrad believes that the very fact that there is such a plethora of media channels in most locales in the US, plus the fact that speculation reigns in the industry currently puts the media out beyond governmental control.

On the relation of politics to technology in the future, he has said that work, as valued in itself, in both capitalism (governed by the profit

● Continued on page 19

'The kind of on going technology we have on this planet has only evolved here once...'

● From page 18

work ethic) and communism ("From each according to his ability, to each according to his need") will no longer be relevant in our computer-based society. Rather than become a philosopher or artist with more leisure time too, the average person will "sit in front of his television set getting madder and madder and madder."

Furthermore, "If you get rid of any function of human beings that can be taken over by machines, or that can turn them into machines, people become more human and can concentrate more on human matters. What automation is replacing in fact is the worst jobs imaginable. Who wants to work 40 hours a week turning the same bolt on an assembly line, which is something a machine can do? All this does is turn that guy into a machine, so I don't think that getting rid of his function is going to make him less of a person.

"But it's going to leave him with nothing to do, and that is a big problem as well. The situation there seems insoluble."

What about retraining and re-integration elsewhere?

"A guy who spent 20 years turning that one bolt on on assembly line is not going to become an astronaut or a computer programmer or anything like that," said Spinrad.

"In fact, fewer and fewer people will be able to create more and more goods and services until a theoretical limit is reached and nobody will have to work and everybody will have everything. I don't know if that means everybody is redundant.

"On the other hand, in a positive way, you can say that one of the highest cultural societies we've had, the Greek civilisation, was built on slavery. A lot of slaves supported aristocrats who created a high civilisation.

"In the future, technology becomes the slave and everybody is the master. However, what you do with people who do not have the intellectual capabilities to get on, I don't know."

Addressing himself to the relationship of the individual to this master society, Spinrad talked about the possibility or even non-potentiality of robot genius, recalling a meeting with Buckminster Fuller.

"According to Fuller," he said, "the human mind can work by intuition . . . it can synthesise conclusion from insufficient data. In other words, it can come up with synergetic interactions that are interactions of the system as a whole and that are not deterministically decided by the input. I don't know if you can build a computer that can come up with solutions that are not mathematically inherent in the data you feed it — at least Fuller didn't think so."

Like Bova, Spinrad does not ignore the possibilities of computer-boosted humans.

"With computers being broken down into really small packages for specific functions, I think we will go more towards the cyborg concept where the human brain is interfacing with all these electronic aids. An example would be a kid having a little computer which he takes to school in his pocket. That doesn't mean that the computer is taking him over, it means that he is plugged into some of the advantages of being a computer in a sense.

"There is a story I did called Riding the Torch, and it features a society that is set in the far future on spaceships where everybody has a kind of transceiver implanted into his brain which enables them to interface with each other through a computer network.

"Among other things, this means full-sensory art forms and there are interesting sexual implications. The computers have banks of everything from information to instant entertainment access: a form of telepathy. But the computers are not the masters of the people."

At present, it appears that technology, as Asimov concluded in a previous interview (Futureview, December 14, 1978), protects us from the "real world" — a borrowed-time effect prevails.

"We have created a need for technology," said Spinrad. "One answer to the question 'Why does man need technology?' is that if we got rid of all of it two billion people would be dead inside of three months. That's one good reason.

"We simply cannot support our current population level or current standards of living without this technological base. We wouldn't be able to feed people, clothe them, house them, do anything.

"And a further theory is that man didn't invent tools, tools invented man (Futureview, November 23, 1977). You never had humans without technology, really. It's just a question of the level. Termites build termite hills, ants build anthills, and people build technology. We just wouldn't be what we are now without it."

While Spinrad sees brain amplification and other marvels leading to extraordinary powers becoming ordinary in our time, at the same moment he is able to express an ethnocentric, almost romantic view of science.

He says: "An interesting thing is that the kind of ongoing technology we have on this planet only evolved here once. There was the classical Greek civilisation and they had things like the aleopile. This was a metal globe with water inside it and a fire under it and a nozzle on either side so that as the steam built up inside the thing it whirled around. Essentially a prototype steam engine. They never made the connection, they never used it for anything.

"The Chinese invented gunpowder and rockets, stuff like that, but it never progressed into an ongoing thing.

"Science was only invented once, really, and this was during the Renaissance period in Europe. Prior to that, many major civilisations have evolved on this planet in terms of fairly high cultures of mind. Among them the Incas, the classical Indian civilisation. The Aztecs too built a tremendously complicated civilisation, but never hit on the wheel. They had toys with the wheel, but it never dawned on them to make a cart with it."

A by-product of this "invention," it appears, is that natural selection as described by Charles Darwin has ceased to operate.

"The human organism has probably stopped evolving," said Spinrad. "I think the reason for this is that we are evolving along mechanical and electronic lines much faster than biological evolution, so that our biological equipment no longer evolves to changing environments. We can change the environments much, much faster than the environments can change us."

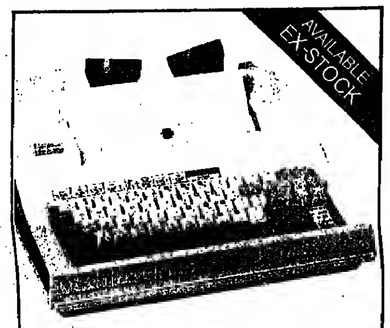
While it took millions of years for man to evolve, in terms of other species that is rapid advancement indeed. But from the simple pre-hominid creatures to our intricate, structured society no single hereditary characteristic has made itself ubiquitous. In his book, The Solarians, however, Spinrad explores this ultimate fear by creating an alien race, controlled by a megalomaniac dictator.

"Concerned with his own mortality, he wants to rule his race after death," he said. "So what he does is construct a great computer, programming it with his personality as close as he can, so that it will essentially be him acting as the decision-making element after he's gone. Then he further programs the computer so that it will control the genetics of the race so as to make a genotype: all the future members of this race will then conform to his genotype as closely as possible.

"So there is this alien civilisation and it's hard to say who is really running it. Is it the machine or is it the electronic ghost of this guy?"

1. The Men in the Jungle, by Norman Spinrad, published by Sphere. 95p.
2. The World Between, by Norman Spinrad, to be published by Jove Books in the US in April.
3. Riding the Torch, by Norman Spinrad, published in Threads of Time anthology by Fontana Paperbacks. 80p.
4. The Solarians, by Norman Spinrad, published by Sphere. 95p.

SPINRAD: "The Aztecs built a tremendously complicated civilisation, but never hit on the wheel. They had toys with the wheel, but it never dawned on them to make a cart with it."



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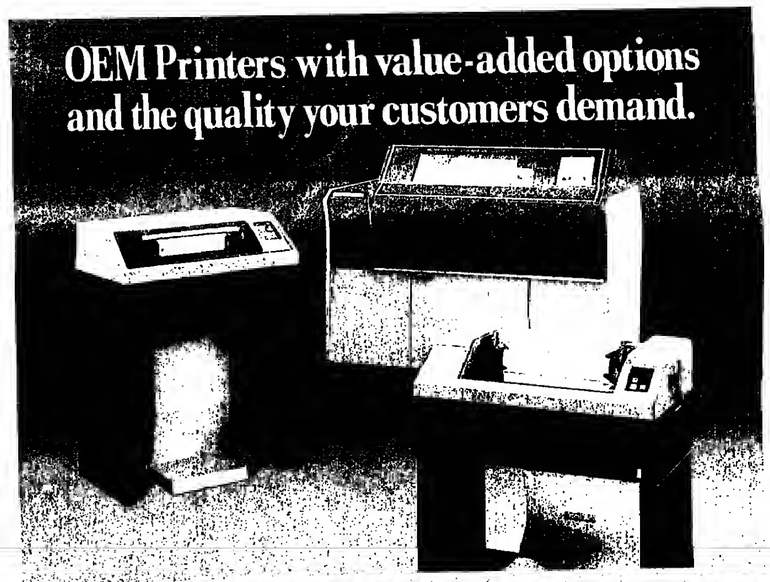

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CONTROL DATA
MORE THAN A COMPUTER COMPANY

A decision-maker that cuts out the woolly thinking

The Consensor Model 3000 terminal, which was displayed to the public for the first time at the Wescon show last autumn.

A retired IBM director, William Simmons, has formed his own company, Applied Futures Inc, of Connecticut, to produce a system called Conesnaor, which is designed to improve the decision-making proces at business meetings. It offers a means of assessing the feeling of a meeting more accurately then on a show of hands. NICHOLAS ENTICKNAP explains how it worke.

DESPITE the invasion of advanced computer technology into almost every aspect of business life, there remains one activity which is still entrusted entirely to the illogical and muddled brain. This is the decision-making process.

Computers have made a major contribution by improving the quality of information available to decision-makers, but the actual decision itself is still made in the traditional esoteric fashion.

Now, however, it is possible to use the power of the computer to speed up this process, by courtesy of a retired IBM director called William Simmons.

Simmons has formed his own company, Applied Futures Inc of Connecticut, to produce a system called Consensor, designed to improve the decision-making process at business meetings.

It works in the following way: When a decision is called for, each participant in the meeting indicates his view via a hand-held terminal.

This terminal allows the executive to do far more than merely say "Yes" or "No." His opinion is represented as a point on a scale from 0 to 10, with zero meaning "Adamantly against" and 10 meaning "Enthusiastically in favour."

This the feeling of a meeting can be assessed far more accurately than on a mere show of hands.

But this is not all. Another scale allows the executive to register the extent to which he feels qualified to make the decision, in terms of background knowledge, enthusiasm or other agreed criteria.

This scale is calibrated in percentages, and there are five options ranging from 0 via 25, 50 and 75 up to 100. Zero in this case might mean that the executive had no background knowledge at all on the subject under discussion, while 100 would mean he was an expert. This second input is used as a weighting factor to modify the first.

The results are calculated and displayed in the form of a histogram on a VDU. This allows the meeting to see at a glance the range of opinions on the subject in question.

It is perhaps most valuably used before any discussion of an issue takes place. When the meeting is unanimous, it saves time by avoiding unnecessary discussion; when it is not, the nature of the disagreement is made plain and this itself can influence the direction of discussion.

There are a number of bypdct advantages from using Consensor. As with other computer systems, it will not tolerate woolly thinking; questions cannot be open-ended or ambiguous, and need to be fairly closely defined.

Another rather different effect is that it encourages people to participate. Everybody's view is taken into account, not just of those who shout loudest.

Furthermore, the system only displays the overall consensus, not how each person voted, so people are not inhibited by political pressures from expressing their genuine views.

Thus Consensor has both a quantitative and a qualitative effect on the decision-making process. Its justification in terms of cost is in the executive time it saves, and this is highlighted by a special display on the screen.

The system has been refined over a number of years, with the latest version, the Model 3000, introduced in 1977, and displayed to the public for the first time at the Wescon show last autumn (CW, September 21, 1978).

It is supplied with 17 terminals at a price of $15,000. Options include additional terminals up to a total of 100, additional displays, and an RS232 interface allowing the display of data from any external database on the VDU.

For potential customers who think the system could be useful but do not wish to make such a large investment without further proof, Applied Futures offers a deal whereby Consensor can be leased daily-dny. Part of these leasing costs can be offset against the cost of a system if it is eventually decided to purchase.

The customer list includes some impressive names, such as AT&T (which has three systems), Xerox, Union Carbide and duPont.

As yet, marketing has been confined to the US, but the company has now appointed a UK representative, Matrix and Applied Decisions, of London SW7, and expects to deliver a demonstration system to them in the summer.

Industrial robots research

A JOINT international research project aimed at the development of the next generation of industrial robots is under way at the Lanchester Polytechnic, Coventry and the Michael Pupin Institute, Belgrade.

The Department of Systems and Control at Lanchester Polytechnic has been working on microcomputer control systems as well as developing an industrial robot. The Michael Pupin Institute has complementary experience of the mathematical analysis and control theory associated with industrial robotics.

Development of the microcomputer control system will enable the robot to move objects about in restricted spaces without outside guidance.

Additional freedom of movement, for example grip, will enable the robot to hold and manipulate objects in any desired position.

Calcomp $25m sale to Xerox completed

XEROX has completed its purchase of the big disc drive manufacturing side of Calcomp (CW, November 9, 1978) for $25 million and has renamed the operation Century Data Systems Inc. It builds the Trident, Hunter and Marksman lines of OEM drives.

This takeover follows the Xerox acquisition of floppy disc drive builder, Shugart, late in 1977.

New company for Simplan

SIMPLAN, the computerised corporate planning and modelling system, is to be marketed in Western Europe, the Middle East and Africa by Scott Systems International, a new company formed by Lowndes-Lambert Computer Service and the US based Social Systems Inc.

SSI is based in Croydon and aims to install the package on large IBM and IBM-compatible machines run by users and computer service bureau for batch and interactive operation.

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MINICOMPUTERS

THE market for real time minicomputers continues to be one of the fastest growing sections for the industry with an annual growth rate in the value of its deliveries in the 20 to 30% range, double that of the industry as a whole.

During 1978, established manufacturers introduced a fair crop of new machines and this dynamic market continues to attract new entrants. Tandem has opened up in several European countries and SEMS from France is planning to market the Mitre and Solar 16 series.

However, predicted changes in the structure of the market and among the leaders have failed to be fulfilled and this year the mini market is much as it was during the start of 1978. Fred Lamond looks at the contenders in the various areas and considers their prospects.

In other features in this review of the minicomputer market, CAP's Michael Pickett looks at software development; Peter Marshall, of Perkin-Elmer Data Systems, discusses the commercial market; while Malcolm Padine, of Prime Computer, writes about the growth of mini power for scientific and commercial users.

Waiting for change in the market structure

By Fred Lamond

LAST year was to have been the year of the 16-bit parallel single-chip microprocessor. Such chips have been offered for some time by Texas Instruments, Ferranti, Data General and a number of other manufacturers, but 1978 was supposed to see 16-bit chip micros appear in the catalogues of the leading microprocessor manufacturers Intel, Motorola and Zilog.

So far only the Intel 8086 has appeared, together with its single board computer version the SBC 86/12. It was announced in June, 1978, and deliveries began in November.

But the Motorola M68000 and Zilog Z8000 remain unannounced except by conference speakers. Even the Intel 8086 is not yet available in a boxed mainframe system in the manner of the eight-bit System 80/10 and System 80/20.

Since no 16-bit minicomputer manufacturer except Data General has yet marketed a 16-bit microprocessor chip by itself, competition between Intel and the minicomputer manufacturers thus remains limited to the narrow market area of 16-bit board single board computers sold to OEMs as sub-assemblies, see Table 1.

Texas Instruments is the only semiconductor manufacturer to compete in the 16-bit minicomputer market across the board, but it has long done so as a fully fledged minicomputer manufacturer in its own right.

At the top end of the minicomputer market, the much heralded 32-bit word minis have been equally slow to appear. Contrary to many predictions, no other leading minicomputer manufacturer active in the OEM single board computer and mainframe chassis markets, followed Digital Equipment in announcing a 32-bit model in 1978.

Data General announced instead the Eclipse M600, a 16-bit word processing system whose floating point calculation throughput is boosted by a back-end parallel array processor.

The only traditional 16-bit word computer manufacturers to have announced 32-bit models in 1978 and early 1979 have been two traditional mini manufacturers, who have long specialised in offering mainly complete systems for scientific calculation, applications at the top end of the 16-bit word performance/price range.

These were Computer Technology Ltd with its new 8020 and 8040, and Prime with its new 50 Series. Another mini maker, Harris Computers, announced its S500 series of 24-bit word computers with 48-bit wide access to main memory.

Interestingly enough, both the new CTL and Prime 32-bit series start at a lower basic price than the old 16-bit models that they replace, and Prime enters the OEM mainframe chassis market for the first time with its new Prime 450.

CTL continues to market the old 16-bit 8050 and its dual-processor version 8070 alongside the new 32-bit 8020 and 8040.

An architecture of direct processor and peripheral controller to memory port links gives the older 16-bit models more throughput power than the 8020s and 8040s which have the cheaper bus architecture.

Thus, we move into 1979 with the traditional minicomputer manufacturers led by DEC still dominating the 16-bit word OEM and system markets. And they are relying on these machines, or packaged systems based on them, for the greater part of their turnover.

Predictions of a faster penetration of the 16-bit word market by microprocessors and of the 32-bit market by minicomputer manufacturers were all based on the current sharp downward trend in hardware production costs and market prices. This has continued as predicted.

Circuit integration densities on semiconductor chips are continuing to quadruple on average every two years, and market prices for given processing power and memory capacities to halve every year.

This downward trend in prices is forcing semiconductor and microprocessor manufacturers to double the combined power and capacity of all the chips that they produce every year just to maintain their turnover, or else to add more packaging or software value to the components themselves.

The same pressure somewhat attenuated is forcing minicomputer manufacturers to both cut prices on their existing output of 16-bit word minis, or offer more powerful 32-bit models at the same prices.

If this pressure on hardware prices has been slower than expected in pushing microprocessor manufacturers into the 16-bit market, and minicomputer manufacturers into the 32-bit word market, it is because the rising cost of software production is acting as an even more powerful countervailing factor favouring stability.

On the one hand, it is taking both microprocessor and minicomputer manufacturers longer to produce even basic software for wholly new models with different architectures.

Intel's RMX 86 multi-tasking monitor for the new 8086 microprocessor and SBC 86/12 single board computer, will not be ready for release until late in 1979, 12 months after the initial delivery of the first chips and SBCs. And 18 months after DEC introduced the 32-bit word VAX 11/780, Fortran remains the only language compiler available under its native mode VAX/VMS operating system that can exploit its greater power.

It is taking users just as long to develop or convert applications programs for a new OEM micro or mini when they switch to it, especially if they are industrial users programming real time applications at assembly language level.

Despite the claimed better hardware performance/cost ratio, greater direct addressing range, and easier configurability in multi-processor configurations Intel's SBC 86/12 has few OEM customers converting from DEC LSI-11 or Data General Micronova boards.

Its customers are mostly OEMs who had to convert their applications programs anyway from an older minicomputer system that they had outgrown, DEC's PDP-8 range for instance, or whose manufacturer had left the market.

It is significant that the only two 16-bit word computer manufacturers to have announced 32-bit processor models since DEC's VAX-11/780 have been two midicomputer manufacturers: CTL and Prime.

Both have, in recent years, sold mainly complete working configurations running under a standard operating system to scientific institutions and small businesses, rather than a variety of hardware items including processors to OEMs using them as sub-assemblies.

It was thus far easier for them than for DEC or Data General to produce new 32-bit processor designs that could exploit the full potential of the greater parallelism and yet remain software compatible with their older product ranges.

It is also significant that DEC should have evoked a much keener market response with its DECsystem 2020 announced in April, 1978, than with its more powerful VAX-11/780 announced six months earlier.

Although using also typical minicomputer based architecture, the 2020 is essentially a cheaper mainframe model in the DECsystem 20 general purpose system range, and can therefore run all the software written for larger DECsystem 20 and 10 mainframes. Whereas software written for the new 32-bit VAX-11/780 has to be written from scratch.

Since their own and their users' own software investments in the RSX-D operating system available on PDP-11/34 and larger systems, and not only on the PDP-11/70:

2 more widespread availability of database management systems.

3 new more sophisticated business transaction processing monitors, such as DEC's Trax, able to process not only the system's own files interactively, but also to communicate with a host IBM or IBM compatible system interactively in 3270 BSC or SDLC mode; and,

4 more minicomputer-based communications network architectures, mostly of the distributed processing network type like DECnet, many with CCITT X25 compatibility, such as the recently announced Primenet.

● Turn to page 25

Manufacturer	8-bit processors offered as:			16-bit processors offered as:				32-bit processors offered as:	
	Chips	SBC	Mainframe	Chips	SBC	Mainframe	System	Mainframe	System
A. Semiconductor component and microprocessor manufacturers									
1. Intel	–	8080A 8085	80/10 80/20	System 80/10 System 80/20	8086	86/12	–	–	–
2. Motorola	–	6800	6809	–	68000	–	–	–	–
3. Zilog	–	Z80	MCB-1	–	Z8000	–	–	–	–
4. Texas Instruments	–	TMS 1000	–	MC2-1 series	TMS 9900	–	TI 980 a	TI 990	–	–
B. Traditional minicomputer manufacturers									
1. Digital Equipment	–	–	LSI-11	PDP-8A	–	LSI-11	PDP 11 series	PDP-11 DS 350 DS 500	VAX 11-780 –	VAX 11/780 DECsystem 2020
2. Data General	–	–	–	Micronova 601	–	Nova 4C	Nova 4 series	DS series Eclipse	–
3. Computer Automation	–	–	–	–	LSI 4	Alpha LSI-4	SyFA	–	–
4. Hewlett-Packard	–	–	–	–	HP 1000	HP 1000	HP 1000 HP 250, 300 HP 3000	–	–
5. General Automation	–	–	–	–	GA 10	GA 16	GA 10	–	–
6. Digico	–	–	–	–	M16E	M16E	Cansort MTS 10E	–	–
7. Ferranti	–	–	–	F1600L	F1600L 700F	700E, F, G	–	–	–
8. DEC Computers	–	–	2050	–	–	4080, 4062	Argus 700 series 4000 series	–	–
9. Modcomp	–	–	–	–	7810	7800 series	–	7860 series	–
10. Nord Computers	–	–	–	–	–	Nord-12	Nord-12 10	–	Nord-50
11. SEMS	–	–	–	–	–	Mitre series Solar 16	SIR-T 860-L, M, S	–	–
C. Traditional minicomputer manufacturers									
1. CTL	–	–	–	–	–	–	8050, 8070	–	8020, 8040
2. Harris Computers	–	–	–	–	–	–	S 100 series	–	S 500 series
3. Interdata	–	–	–	–	–	t8 series	t8 series	32 series	32 series
4. Prime Computer	–	–	–	–	–	–	–	400	050, 650, 750
5. SEL	–	–	–	–	–	–	–	–	32 series incl 32/7780
6. Tandem Computers	–	–	–	–	–	–	16 Non-Stop	–	–
D. Traditional minicomputer manufacturers									
1. IBM	–	–	–	–	–	Series/1	System/34 8100	–	System/38 4331
2. Honeywell	–	–	–	–	–	Level 6	Level 6, Level 62	–	Level 64
3. Univac	–	–	–	–	–	V77 series	V77, 80/7	V 77/600	V 77/000
4. CDC	–	–	–	–	–	–	Cyber 18 1500 series	–	–
5. ICL	–	–	–	–	–	–	7500 series	–	–
6. Siemens	–	–	–	–	–	–	4004, 4004	–	81800
7. NCR	–	–	–	–	–	–	8250	–	8450

Table 1. A comparison of the product ranges of microprocessor, mini and mainframe makers.

In Section A, the Motorola 68000 and the Zilog Z8000 have not yet been formally announced. In Section B, the DEC LSI-11 and PDP-8A have 12-bit word length and parallel processing; the DECsystem 2020 has a 36-bit word length; the SEMS range is due to become available in the UK during 1979. In Section C, the Harris S 100 series has a 24-bit word length; and the SBC series has a 24-bit parallel processor with a 48-bit wide access to main memory. In Section D, the 2903/2904 has 24-bit word length.

Bold type indicates models introduced since January, 1978. SBC means single board computer, and in this table "mainframe" refers to complete units with power supplies, memory and control panel as supplied to the OEM market. It does not necessarily include peripherals.

Big shake-up for software coming soon

TODAY'S minicomputers are crammed tight with some of the most complex software imaginable. How will things change in the future?

Initially, the development of software for minicomputers followed the same path as did software development for mainframes a few years earlier, and incidentally we'll soon be saying the same thing about microcomputers.

In many ways, the early mini was not much different from the forerunners of the mainframe, except for the technology.

The minicomputer found life as a piece of laboratory apparatus, and a crude assembler was all the software its early users needed.

But as more and more users developed the skills to put these machines to work at tasks of ever-increasing complexity, the higher became the users' expectations.

Hardware developed and so did the software, with the mainframe setting a target of performance on which the mini manufacturers could keep their sights. Just as had happened for mainframes, large, complex operating systems were created and high-level programming languages became the norm.

Since about the middle of the decade, we have seen a crisis developing in the mini's world, a crisis brought about by the natural barrier presented by the mini's architecture.

The standard word length for a mini has tended to be 16 bits, with a few exceptions. Indeed, in many people's book, this is the defining criterion for membership of the mini club.

But the word length restricts two important features: the values that may be held and the size of directly addressable storage.

In 16 bits, we may hold a cash amount not much greater than £327. True, if we use double-length storage we can hold upwards of £21 million but for most minis, 32-bit working requires multi-instruction sequences, considerably reducing their efficiency.

The 16-bit word limits the directly addressable storage to 65,536 words, or in some architectures, to half that figure, another disincentive to multi-length working.

Attempts have been made to overcome the addressing limitations, often copying mainframe techniques — base and limit registers, page and relocation registers, independent data and instruction domains, virtual storage, swapping — each scheme imposing its own particular burden on an already overburdened operating system.

The consequence is that software of steadily increasing complexity is rapidly reducing the efficiency of minicomputer systems and users are finding that new releases of operating systems and support software, incorporating enhanced features, actually run more slowly than previous releases.

Slowly it is dawning on the mini makers that, if you want to do the work of a mainframe, you need to adopt a mainframe achitecture, and so now we are witnessing the emergence of the 32-bit "mini."

Thus, we are rapidly approaching the stage when we shall have a full spread of architectures from the number-crunching mainframe to the starkly functional microprocessor.

For some time, however, there will remain the problem that the software is ill-matched to the hardware, largely due to the tunnel vision of the manufacturers.

Software for mainframes, minis and micros has been developed independently by different "generations" of manufacturers.

Each generation fails to anticipate the software requirements of potential users of the product line, and when those requirements become known, develops a solution from scratch.

However, market pressures will prevail and only those systems which provide a good hardware/software balance will survive.

On the assumption that software will remain expensive relative to hardware, a "good" balance will imply clean and tidy systems, in which it is the user's problem which is processed, not the manufacturer's.

So where will the mini, whatever that term might mean, fit in this new, rational world? Despite prognostications of its death, the mainframe will survive, adapting to changes in technology and providing high speed, high power computation, while at the bottom end, the micro will have taken over the mini's historic role as a data gatherer and preprocessor.

The mini's role then lies in that zone in between, and it is that zone which will define the term "mini" in the future. There will be applications which are recognised as minicomputer applications.

If mainframes were to be used for these applications it would be considered overkill; micros might be capable of doing the job but the complexity required of the software would not be worth the effort.

What are typical applications that might be found in the in-between zone? Consider a factory with a network of computers providing various levels of service from process control to management information.

In this network, the mini computer may be literally "in-between," providing coordination of the various plant functions, and input to the information system.

Process control logic and instrumentation will be handled by intelligent, micro-based controllers, each of which has had its program, or perhaps merely its parameters, loaded down-line from some supervisory mini.

A mini will supervise a group of controllers, or even a whole plant. It will monitor the operation of the controllers to detect malfunctions, revise their programs to reflect changes in the work being undertaken, liaise with other minis performing similar tasks, and provide statistics on plant operation for use in the management information system, which may still be running on a mainframe.

In this role, the demands placed on a mini are well within the constraints of its architecture. Computation is minimal and although access may be required to large amounts of data from time to time, in general, random access would be required and access is seldom to be urgent.

The implication is that although multi-tasking and real-time features are required of the software, these don't have to be at all sophisticated.

One area where minicomputers have already made a name for themselves is in communications. Here the architecture is no problem. The requirement is for throughput, so once again the pressure is for low software overheads.

Simplification of the software will again be possible as the handling of line and perhaps some higher level protocols will be farmed out to micros, leaving the mini to handle routeing, network integrity, storage, and end-to-end protocols.

A popular computer sales pitch is device-independent software. Such independence is normally achieved at the expense of a plethora of device handlers working in the operating system.

In the foregoing examples it was shown how software can be simplified by farming out certain tasks to micros.

The logical development of this is to put intelligence into every peripheral device and to establish a set of standards for logical interfaces between these devices and computers, thus minimising the need for handlers.

The mini is limited in the commercial field by its word length, but this is overcome, at the expense of efficiency, through the use of multi-length working.

For many small businesses this still leaves enough power for the work required, and although mainframes are becoming cheaper, ... able to assume the ... time, there will ... isations which ... to use minis.

The most common high-level language ... commercial pro... Although Cobol ... ported on a few ... expensive language ... mini resources.

With software ... manufacturers ... inclined to provide ... pilers, preferring ... compilation on a ... machine, or a simp... cial language ...

However, ... munications software ... simplified ...

● Turn to page 27

The days when complex software is needed to overcome hardware deficiencies are numbered, according to MICHAEL PICKETT. He believes that software for mini systems will have to be functional and oriented towards the processing of applications whose complexities are matched to the mini's capabilities.

Pickett is a senior designer in CAP's industrial systems group. He currently represents CAP on the DoI team reviewing the Steelman language and is a member of the BCS.

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8 DMA Channels.	☐	Choice of BASIC, FORTRAN, ASSEMBLER, MATHCHAT, LABCHAT, plus user supported languages.	☐
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As an intelligent terminal it can a) talk to the central machine b) run batch work c) support interactive users d) run compiled Basic e) fulfil a, b, c, d, simultaneously	☐	Floating point hardware.	☐
		ADC DAC DLI DLO	☐
		Full printer spooling as standard feature of BASIC and FORTRAN.	☐
As an ICL FEP (7903) it can run up to 32 terminals and drive interactive BASIC simultaneously.	☐	Disc capacity of 0.3 M bytes to 200 M Bytes	☐
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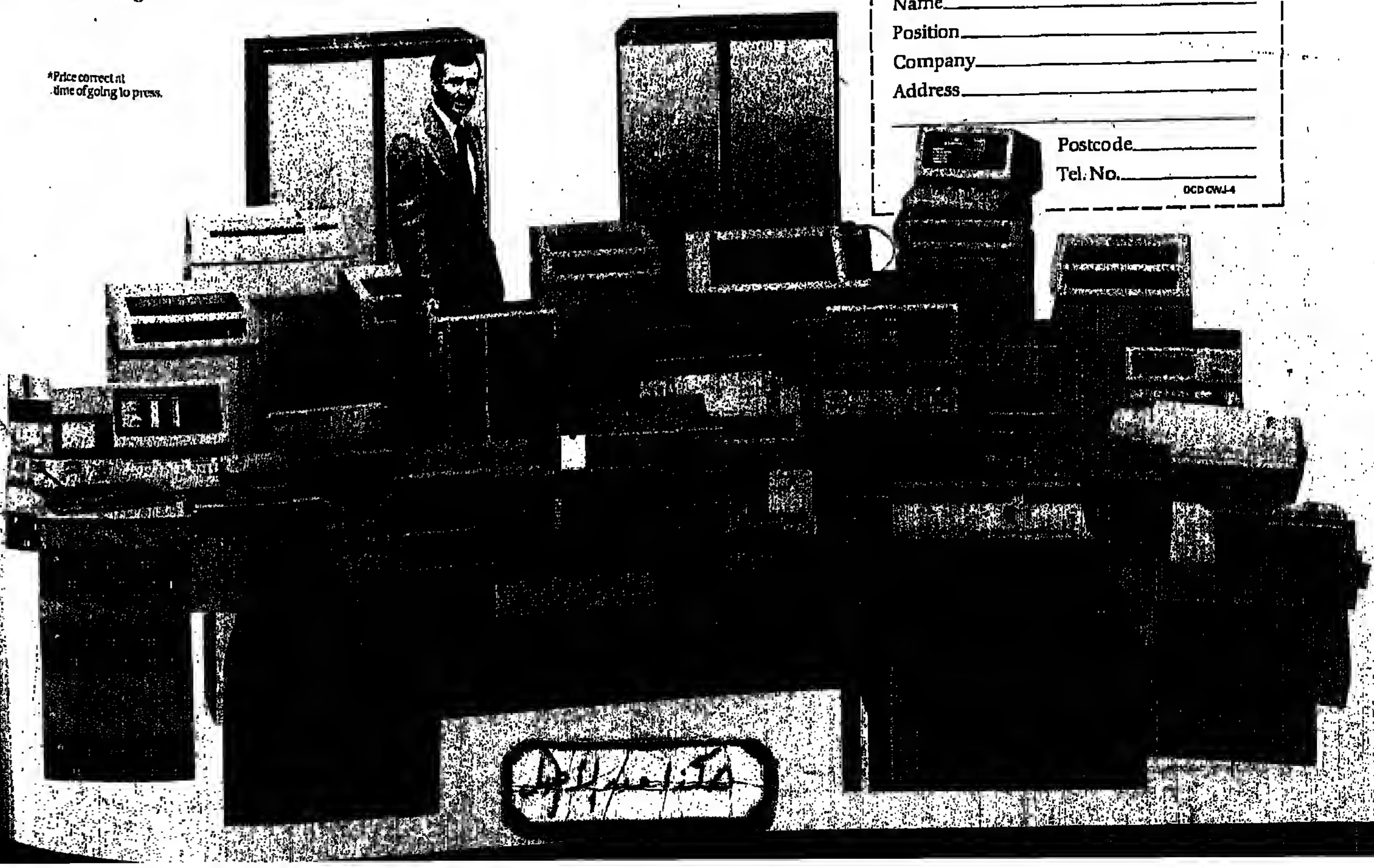


Only the dedicated can survive onslaught

ARE the 1980s to re-write the end of the traditional David and Goliath story where innovation and daring overcome the forces of propaganda and size, or could Golinth this time win the day?

As the computer industry reaches the end of another decade it is pertinent to reflect upon the impact that the machines it produces, in ever increasing end eagerly accepted numbers, have had upon the business sector of the community in the last few yeara.

Much of this impact cnn be attributed directly to the manufacturers of minicomputers.

It is now clenr that the long accepted definition of minicomputer nn longer applies. Where once this prefix of mini implied limitations in both hardware and software it now applies mainly to cost and then not always so.

As LSI circuit technology constantly advances and the price/performance ratio of minicomputers improves, leading manufacturers are producing ever larger systems to the point where memories of 1 Megabyte and larger abound.

Driven by a need to phyaically address auch memories there is a definite move away from the traditional 8- or 16-bit word of the early mini to the 32-bit word of its bigger brother.

Various techniques now being used such as high speed cache memory, additional internal buses and multiple interconnected processors have given the mini a computational and throughput capability which clearly puts these machines in the mainframe league.

What we will call these new machines is open to argument but it cannot be denied that they should no longer be categorised as "mini."

The greatest strength of the minicomputer manufacturer has been ite ability to respond to technological innovation faster than the mainframe suppliers, due in the main to a lessar investment in manufacturing facilitiea and staff.

The increaaing cost of maintaining thia lead coupled with a natural desire for expanding markets and greater profits has led to a gradual emphasis of their activities into commercial data processing.

By a studied adoption of a packaged businees system concept, the mini manufacturer is fast becoming recognised as a supplier of not only processors but peripherals and syatem software as well.

Many companies, by careful acquisition, now have a complete low cost system manufacturing capability which is contributing to the enormous success that minicomputers are currently enjoying.

The traditional third generation business computers offered by the mainframe companies were invariably large batch orientated systems taking their data input from cards or tape for validation and subsequent file update.

The cost of moving to user orientated video terminal systems was normelly highly expensive and complex.

Calling upon the considerable experience gained in the scientific and process control markets in terms of microprogramming and highly sophisticated multiuser real time operating systems, minicomputer manufacturers have quickly ascertained the additional facilities needed in this new area.

Recognising the importance placed on system software in this market they have quickly responded by adding high level languages, data management facilities, comprehensive development tools and utilities together with transport data communications handling.

This has created a new breed of interactive business computer which fits into a normal office environment without a need for air conditioning, false floors or a highly expensive data processing department.

These new systems have, for the first time, brought system development, data entry and processing to the end user in a fashion that the mainframe suppliers have been unable to equal at the price. And all without a card punch in sight!

Any supplier wishing to ensure success in this market must be able to supply not only the hardware and system software but also a comprehensive range of ready to run application packages which must be structured to allow the user to do simple modifications without the need for highly skilled programmers.

To this end the astute manufacturers have forged close links with systems houses developing and implementing interactive packages which can easily be adapted for the needs of most users.

The newest vehicle for this is a highly sophisticated transaction processor linked to a simple yet efficient data management system.

These transaction processing systems react to the input of data in a way previously only available on mainframe computers at tremendous cost and high machine overhead.

In this new environment it is the data which determines which application module is to be called in from auxiliary storage media to process the message submitted via a video terminal.

Tha traditional batch system demands that all like data be collected and submitted together which, by its nature cannot avoid placing restrictions upon the users.

Transaction processing not only gives a business great flexibility in that the response to data entry ie directed to tha eource of that data but also that the entire aystem now functions as an integral part of the business.

By linking this process to an efficient and complate data communicationa facility the syetem can provide immediate information or data antry facilities to any location of the company in which is it installed.

Transaction processing lends itself ideally to the distribution industry, whare tha major requisites are tight controle ovar inventory matched to fast and afficiant order procaesing and cash collection.

By allowing tha monitoring of these functions these eyatems have become the main eource of the management information from which vital business decisions can be made.

The relatively low cost of these new systems mean[illegible] companies are now investig[illegible] their own data processing [illegible]ities where once the high [illegible] and running costs could [illegible] justified.

Other companies whose made this investment a[illegible] longer willing to add more [illegible] peripherals to existing ma[illegible]frame but are developing [illegible] applications of an interac[illegible] nature to run alongside t[illegible] current hardware with a [illegible] term commitment to disp[illegible] with the mainframe altogeth[illegible]

As this advance into the c[illegible]mercial deta processing mar[illegible] gains impetus most [illegible] manufacturers realise that [illegible] level of support once offere[illegible] their scientific and engineer[illegible] users is not good enough.

The need for specialisation [illegible] the system and application [illegible] is recognised ond leading [illegible] pliers now offer support servic[illegible] comparable to the majority [illegible] mainfreme companies.

This has led to these suppl[illegible] rapidly becoming adept [illegible] recognising and solving bus[illegible]ness problema where once the[illegible] solved hardware problems.

And what of the future?

As we move into the 80s [illegible] will sue an even greate[illegible] emphasis on data managem[illegible] and networka linking [illegible] sharing processors.

The interface between the user and tha system will become increasingly simplified while the power and flexibility of the sys[illegible]tem increases.

Having extolled the virtues of these new and exciting systems let us not asaume that the mainframe manufacturers are still in blissful ignorance of the existanca.

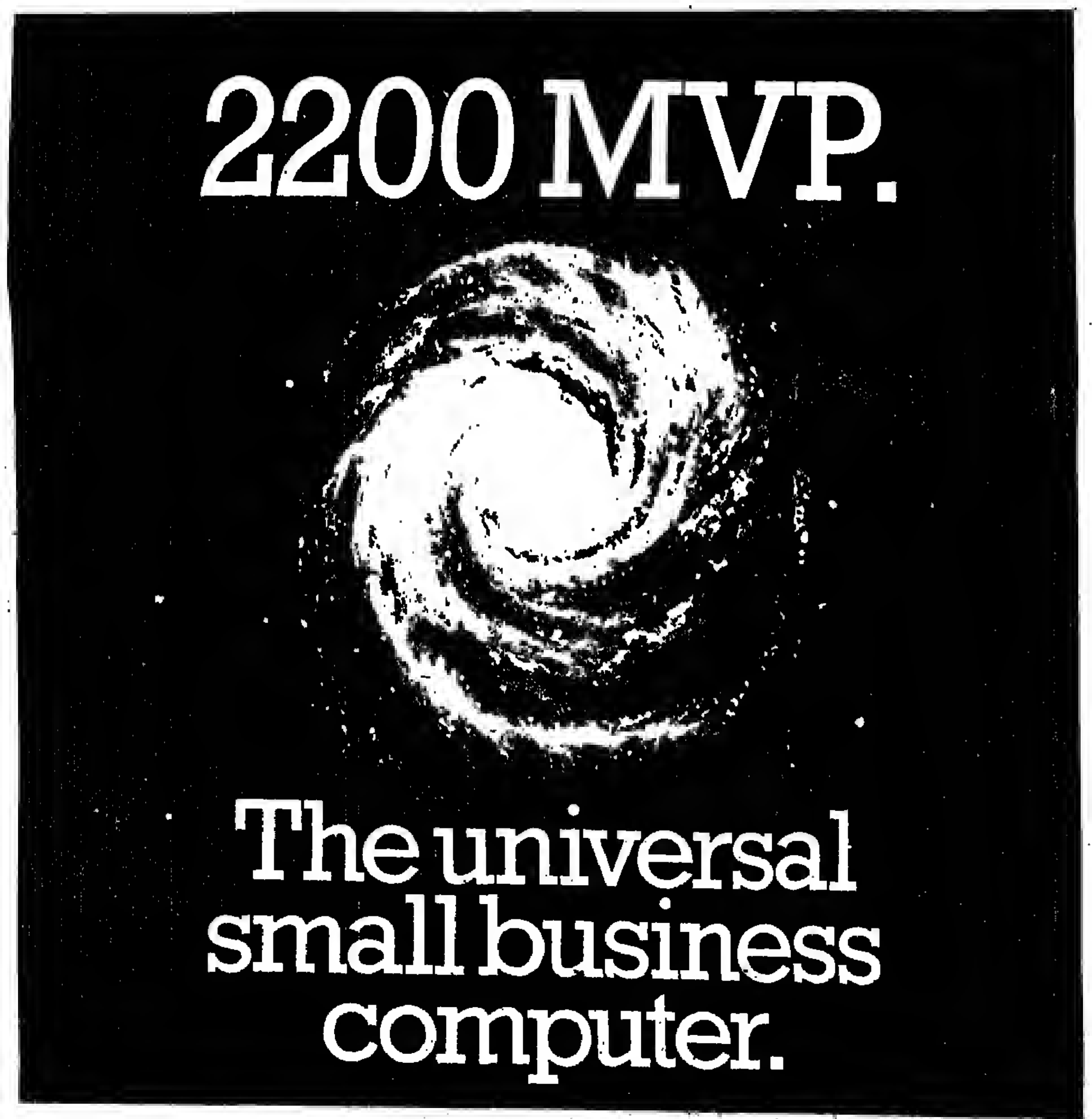
Indeed, David having chosen his weepon has today not succeeded in winning the battle [illegible] has only thrown down the gauntlet. This has been picked up with remarkably little reluctance by his co-competitors.

They heve the ability to produce technology surpassing that which tha minicomputer manufacturer has developed over the yaars, to surround it with power and prestige, to improve it with their access to vast R&D budgets and manpower and to market it with all the weight of their considerable experience in the commercial arena.

Only the most dedicated and tenacious minicomputer manufacturers will be able to withstand such an onslaught.

Thus they are now faced with the formidable task of meeting Goliath on his own ground and today Goliath also has a [illegible] shot[illegible]

How much longer can we assume that mainframe manufacturers will remain blissfully ignorant of the mini? According to PETER MARSHALL, of Perkin-Elmer's computer systems division, not for long in his study of the commercial market, Marshall aays that in the 1980s, only the most dedicated and tenacious mini manufacturers will be able to withstand the onslaught from the big battalions.



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Little new competition

● From page 21

Instead of entering the difficult 32-bit word midicomputer market, most mini manufacturers are seeking to add value to their hardware output by the simpler method of packaging their existing 16-bit word minicomputer ranges into complete configurations for specific markets, and increasing the share of these packaged systems in thair total turnovar.

Tha small businesa and distributed processing markets remain the most raccptive to these packages and competition has continued to grow.

DEC's lead of several years ago in packaging its PDP-8 and PDP-11 seriea into "datasystems" waa followed in 1978 by Data Genaral with ita CS seriee, General Automation with its DS series, GEC Computers with its 4060 and 4062, Digico with the Consort, SEMS with its SIS series, and, in West Germany, Siemens with its 6,000 series.

DEC for its part launched two new types of PDP-11-based packages during 1978, the MINC-11 series for the industrial automation market, and the PDT-11 series of programmable LSI-11 controlled data terminals.

The heavy investment by systems houses and industrial usera in applications softwnre for existing minicomputer ranges has also prevented the general purpose system manufacturera from making a greater impact on the OEM minicomputer market with their later 16-bit models.

All the leading mainframe makers have manufactured 16-bit minicomputers for quite a long time, for use in their own front-end communications processors, remote intelligent terminal controllers, and small businesa computers, Table 1. They differ only in whether they also market these or other minis on the OEM and process control markets as well.

Both IBM and Honeywell have done so for over 10 years. They have simply put more marketing energy behind their current Series 1 and Level 6 ranges, than they applied to their earlier System 7 and System 700.

In 1977 they were joined by Univac when it took over Varian Data Machines and its V77 series. So far no other mainframer has joined them.

When IBM launched Series 1 in October, 1976, it was widely predicted that within three years the company would have overtaken both Data General and Hewlett-Packard in its minicomputer aalea, and be second only to DEC.

This has not happened, unless one counts the System 3, 32 and 34 business systems among IBM's minicomputer deliveries, in which case it has heen Number 2 in minicomputers already for several years.

The only minicomputer applications areas in which the IBM Series 1 Honeywell Level 6 and Univac V77 series have made an important impact are communications network control, and distributed processing systems.

In this respect, the Series 1 competes more with the other IBM products — 3705 FECP, 8100 Information System, Systems 34 and 38 — than with other minicomputer manufacturers.

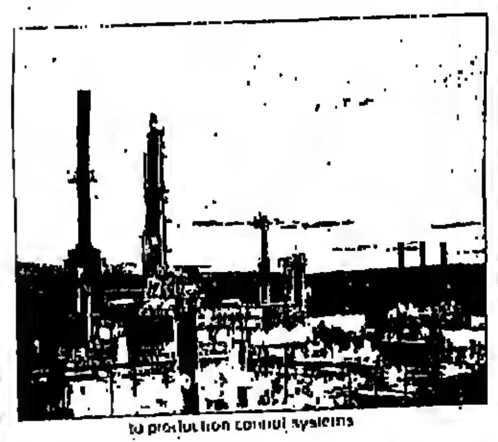
Honeywell is actively developing its Level 6 for both the small business computer and the OEM markets, but is achieving most success with it in the former.

Its OEM sales have mostly been to existing users of its earlier System 700, and for private packet switching networks, especially in the US.

Competition between the leading mainframe manufacturers and the traditional minicomputer manufacturers thus remain confined to the one market segment where it has already existed for quite a considerable time — multi-terminal transaction processing small business computers, and distributed processing systems.

to transaction processing systems

to small real time systems



to production control systems

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The low-cost way to mainframe power

By Malcolm Padina

The price of mainframe power continues to drop, largely as a response to the challenge of minicomputers. MALCOLM PADINA, marketing director of Prime, surveys the current scene with particular reference to networking for scientific and commercial users.

MINIS and mainframes. The distinction between them both in size of processing power and market place becomes more blurred every day. Just as the four-bit microprocessor found in pocket calculators was the stepping stone to the more versatile and commerically acceptable 16-bit microprocessor recently launched, the minicomputer today is doing the mainframe job of eight years ago.

To quote a study carried out by consultancy Wootton, Jeffreys and Partners in 1971, "the results (of the study) suggest that for a small fraction of the cost of a large computer, an IBM 370/145 or ICL 1904S, for example, one can buy a mini capable of offering a similar performance."

In pure processing power, if not in applications software, minis traditionally offered everything a mainframe could do but for 1/10th of the cost.

Since then powerful 32-bit address spaces, virtual memories, cache memories, Megabytes of online disc storage and sophisticated communications facilities that enable batch, time-sharing real time and remote batch jobs to run simultaneously have been added to minis as a matter of course. Prime's systems, like others, offer 32 Megabytes of virtual address space and enable a user to work with a database as large as 24 billion bytes.

The mainframe manufacturers have accepted the challenge of the mini. Prices of mainframe processing power have dropped significantly over the past two years to counter the mini challenge.

At the same time mini manufacturers such as Prime have developed applications software to compete as suppliers of computer facility over the whole computer marketplace.

For commercial data processing applications, minis and mainframes, soon to be joined by the mature micro, compete together. But the scientific marketplace is still dominated by the minicomputer.

It was the scientific marketplace that leapt at the opportunity to buy and use these fast, small computers that offered lots of processing power without the high overheads of the applications software so carefully developed for the commercial data processing markets by the mainframe companies.

Scientific users were interested in the hardware for its own sake and the low hardware cost allowed them a good base to build on their own software — and software development has never frightened scientific users. Every minicomputer manufacturer had its roots in scientific computing.

And it is the important feedback obtained from this market place and the demands put upon minicomputer suppliers to satisfy the scientific community that have led minicomputer suppliers to develop in three crucial areas.

Crucial because these three areas have enabled the minicomputer suppliers to make a powerful and effective attack on every branch of data processing and pose a threat to the mainframe companies.

These three main areas are:

1. In real time multi-programming environments where scientific users demanded robust multi-user program development systems with a low level of operating systems overhead;
2. In supplying a lot of cheap power to cope with the large programs traditionally involved in all branches of scientific computing; and,
3. In flexibility of programming languages designed to deal efficiently with real time computing.

The scientific community typically requires computational facilities via systems that will simultaneously support batch and real time local and remote working, a wide range of, and large numbers of, terminals — whether they be teletypes or graphics terminals, and support printers, printer plotters and plotters.

Typically the scientific user develops his own applications software and the supplier develops the systems software. Minicomputer suppliers have gone on to develop sophisticated networking techniques for clients.

This has led the major mini suppliers to develop complete networks for their own systems, so that users can access and share network resources.

Files, for example, that are physically connected to a different system from system logged into can be shared and transferred; in this way one user can make use of extra processing power or bigger memory space on another system in the network.

It is the mini suppliers that are leading the way to real inter-processor networking.

Nowadays vast databases which have been developed holding important statistical data for branches of the scientific community are held on big central computer systems, ready to be interrogated online via X25 protocols by the scientific user sitting at his terminal.

The majority of databases for example, offered by the European Community network Euronet when it goes live shortly are aimed at research workers, information scientists and engineers.

The demand by users of the facility to link to these databases has been met by the development of high level data link controls (HDLC) protocols for minicomputers that enable a network of one computer suppliers' equipment to be linked via X25 protocols to packet switching networks and thereby to other computer systems.

Scientific users in particular usually have lots of big computations to carry out, often supported by very large programs.

Inexpensive processing power is therefore particularly important to them so that they do not have to cheese-pare through their programs, ... laying everything in sight. Some examples of processing requirements by major users illustrate my point.

At RAE Farnborough, a Prime 300 is used as a host computer for a Plessey IDP ... image data processor for analysis of remote sensing ... from satellite and aircraft ... of Landsat multispectral images contains 32 Mega...

There are approximately 120,000 Fortran statements ... Pafec's finite element analysis system, Pafec 75. It has ... large because it contains ... type of finite element ... to tackle an enormous range ... engineering problems including the calculation of stress ... flexibilities, resonant frequencies, temperature distributions, critical loads and non-linear calculations.

A minicomputer whose bread and butter has been the support of just such large programs ... cost conscious scientific community is the ideal system on which to run such a program.

Consulting engineers Rendel Palmer and Tritton themselves converted the major structural engineering package, Asas, ... stress analysis on engineering structures and previously, because of its size, only run on ... large computer systems, to run on a 256K byte Prime 400.

Small wonder that the operating software and computational power developed by minicomputer manufacturers to support these large scientific and engineering programs has leapfrogged them into database management systems development for the commercial market.

The minicomputer suppliers have put a lot of effort into developing compilers for languages such as Pascal, Algol and Coral 66, languages designed and developed particularly for scientific and real time applications. Coral 66 for example was user-developed. It was developed by the Royal Radar Establishment for the Ministry of Defence, as a high level language particularly suited to real time applications. Coral 66 compilers were rapidly produced by minicomputer suppliers, but are still not widely available on mainframes.

Compilers for Pascal are again only usually found on minicomputers. Pascal is particularly useful because it is a highly structured language very often used in educational environments and computer sciences departments and computer applications.

For graphics applications, Gino has been developed to solve particular graphics applications problems — again it is available almost exclusively on minicomputer systems.

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Skirmishes on the road to selection of equipment

The choice that confronts a potential user when planning to buy a mini or a mini-based system is formidable. The alternatives can be enticing or confusing. John Evans, managing director of Ansafone Rentals, talked to LAURA TATHAM about his experiences with several suppliers when updating his company's system.

SOON after his appointment in early 1978 as managing director of Ansafone Rentals, John Evans decided to upgrade the system in current use for maintaining tens of thousands of customer records and accounts in connection with rental contracts for telephone answering machines.

For several years, the company had been given an excellent service by a bureau which batch processed purpose-written programs on its ICL 1903T. The trouble was that the system itself had become obsolescent. Data preparation was unnecessarily expensive and laborious, for source documents prepared by Ansafone's administrative department were sent to the bureau for key-to-disc entry.

An even more serious drawback was the lack of facilities for online file interrogation and updating for the large number of inquiries and amendments generated by the company's operations.

Evans believed that an in-house key-to-disc data entry system and minicomputer would solve these problems and bring the added advantage of allowing closer management control.

This new approach, he thought, could most comfortably be implemented in two stages. During the first, the bureau would continue to process the existing programs using data prepared by Ansafone and output on ICL-compatible magnetic tape. When the staff had gained the necessary experience and confidence and the programs had been written in Cobol for processing in real time, the new minicomputer could be phased in.

Equipment selection is always, to some extent, a subjective process in that it depends a good deal upon the prospective user's reaction to the "personalities" of supplier companies and those of their individual salesmen and other staff. This was, perhaps, particularly true in the case of John Evans, who had worked for seven years with IBM and had held executive positions with three minicomputer and data entry companies.

Four key-to-disc and 12 computer suppliers were invited to submit proposals. The Ansafone letter to all these began by outlining the current and the proposed new systems saying that the latter would be implemented in two stages.

It included a schedule describing the types and volumes of data to be handled. It specified the performance requirements and capacities for hardware and stated that software for the second stage must include a real time operating system and a high-level language (preferably Cobol) compiler with screen formatting facilities.

Evans was unimpressed by the responses he received from three of the key-to-disc suppliers. In the case of the fourth, however, he said, there was no response. "To this day we have never had a reply, though our letter was mailed in June.

"ICL were reasonably quick off the mark, but I did not think they had understood our requirements at all because they suggested two 1500 Series units with data entry cassettes.

"After some telephone calls Redifon proposed the new R Range and gave us what was, in my opinion, a totally unsuitable demonstration. The R Range system they showed us would have cost us twice as much as Seecheck, and we could not see it offered any real advantage."

Inforex, John Evans' previous company, made a good impression. They gave what he describes as "a very professional" demonstration of their 1303 system and quoted a price he found acceptable.

In mid-July he wrote them a letter of intent.

Evans' comments on some of his preliminary skirmishes with minicomputer suppliers were also uncomplimentary.

"IBM refused to put anything in writing until they had talked personally to the managing director. As I was not prepared to see them, they had to settle for my operations manager — after all, it was primarily his project.

"Eventually they suggested a Series 34, but without magnetic tape. The salesman made it clear that he thought magnetic tapes were old hat and that we'd be much better off with a pair of floppy discs as a backup and data transfer medium.

"We pointed out that floppy discs could not conveniently interface with an ICL 1903T but as he affected not to know anything about that system we reached a stalemate."

ICL's proposal was for a 2903 system. "Though they first quoted us £170,000 they reduced this by £30,000 after talking to us." This company, however, cut little ice with Evans. "I thought their approach was amateurish and felt they still did not really understand what we wanted."

In order to compare the merits of these and other suppliers' proposals, Ansafone prepared a large features matrix. Across the top were the suppliers' names. Down the side were the headings under which their offerings were analysed: System type; hardware specification (subdivided under memory, disc store, mag tape, VDUs, printer and card reader); the expansion capability in each hardware category; capital cost; rental and leasing charges; delivery period and charges; installation charges; warranty period; maintenance service provided, with cost; language(s) supported; software supplied; initial cost and licence fee of software; the training facilities offered, with cost; and general comments.

A study of the computer suppliers' proposals soon led to the conclusion that the two-stage approach would be unnecessarily costly. Data entry could be carried out through VDUs linked to the mini, thus making a separate key-to-disc system redundant. The company therefore cancelled its letter of intent to Inforex.

Elimination of unsuitable proposals was not too difficult. Hewlett-Packard and Prime responded quickly and appropriately but Ansafone thought the systems they suggested were too costly. Univac also answered promptly but said none of its equipment was suitable.

At £58,000, Texas Instruments' hardware was far less expensive than any other, but magnetic tapes were non-standard and they could not demonstrate suitable software.

A proposal for a Honeywell Level 6 from a systems house, Computer Factors, reached the shortlist. Standard Honeywell Cobol facilities, however, did not include easy screen formatting or some of the sub-routines that Ansafone needed. Cost was also marginally higher than that of the system which was eventually chosen.

"Curiously enough, we had proposals both from Data General itself for a CS/60 system and from Data Communications Corp. The system house offered us either a CS/60 with DG software or an Eclipse with its own TPS operating system.

"Data General gave us an excellent demonstration but we felt uneasy about their ability to give us enough support and eventually chose DCC mainly for that reason.

"The CS/60 configuration includes 192M bytes of disc store, printer, magnetic tape and 10 VDUs. It is now installed at our Camberley offices where development work is in progress. There is a good potential for expansion of disc and VDU capacity and comprehensive interactive Cobol facilities."

Shake-up for software

From page 22

with most mini systems, and therefore when necessary, a mini may be used as a remote job entry system to a suitable mainframe where cross-compilation facilities are available.

The same considerations do not apply to most other high-level languages available on minicomputers to nearly the same extent. Generally, at least in some form, compilers for these languages can be accommodated by the mini architecture.

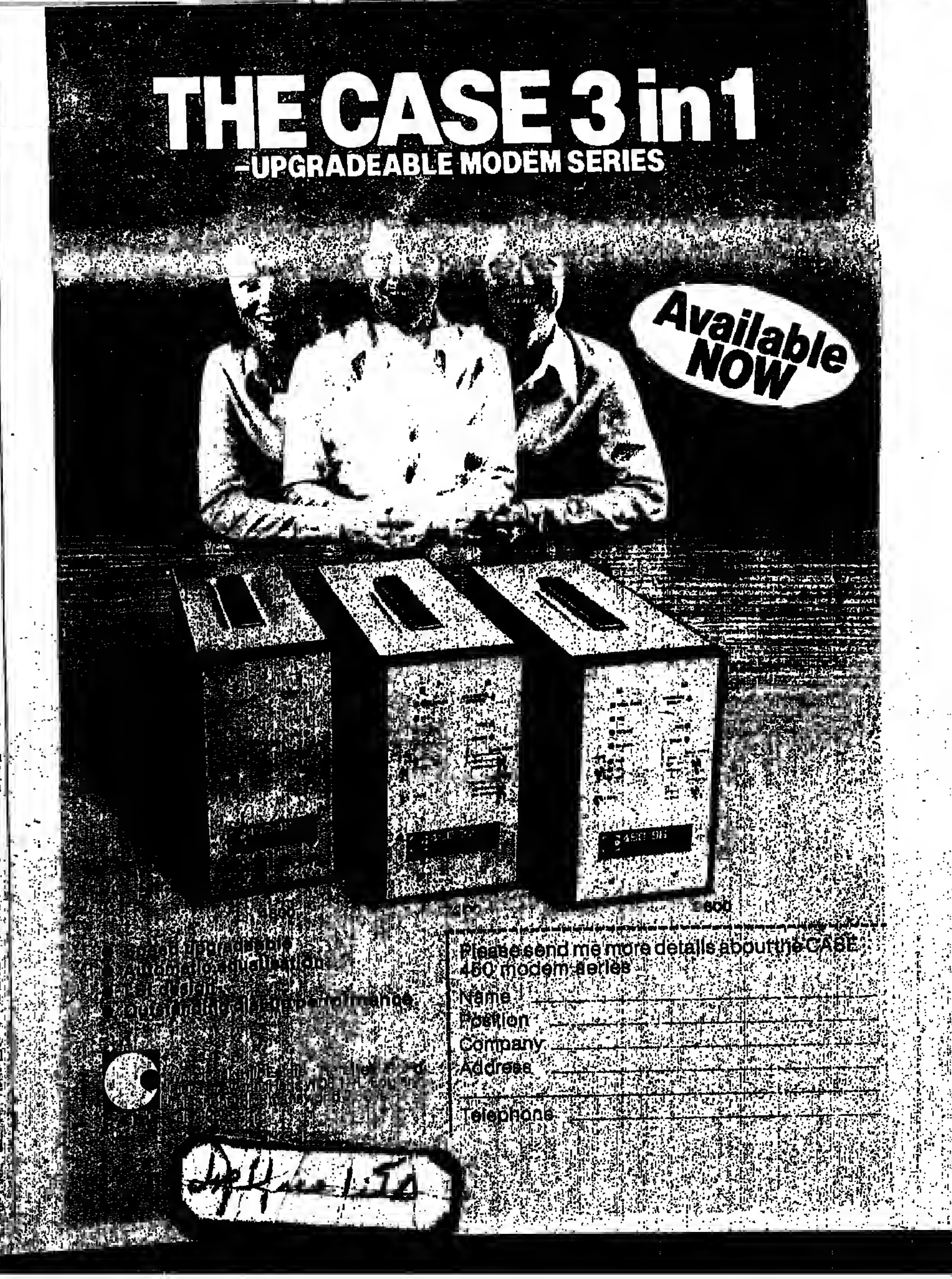
However, in the future, the most sophisticated compilers are likely to be found only as cross-compilers on mainframes, mainly because mainframes will provide the most economic environment for their development.

Minis will themselves generally act as hosts to cross-compilation facilities for micros, and much software will be written to serve the development of microcomputer systems.

There is currently available, a number of graphics systems based on minicomputers. In fact, all sizes of machine are sold with some form of graphics package.

In summary, due to the ability to provide hardware with almost any chosen level of power, it will become less necessary to write complex software to overcome hardware deficiencies.

This will result in a shakeout in the minicomputer field leading to systems being offered with clean, functional software oriented towards the processing of applications whose complexities are matched to the minicomputer's capabilities.



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The Company offers en excellent besic selery plus car allowence and bonuses geered to both individual end team peformence. Career prospects are perticulerly attrective and applicents mey look to progress into management.

Ref. S1/0504

OPERATORS 2 SHIFTS
(NO NIGHTS)
N.W. LONDON c £4500

One of the most successful retailing organisetions in the U.K. hes recently installed sophisticated meinframe equipment end is currently seeking to recruit additional operators.

A variety of interesting applications ere processed incorporating a mini based communications network presenting a technically stimulating environment with plenty of job interest.

Candidates should heve at leset one yeer's experience, preferably in e emell multi-programming installation, end be capeble of demonstreting both initiativs and a sense of responsibility since they will be required to work with a minimum of supervielon.

In any period of three weeks you will work two day shifts and one evening shift, covering the hours between 9.00 e.m. nnd midnight. To the enthusiastic person, there is the opportunity to accept additional responsibility of running a shift or even progress to a programming career providing you possess the necessary aptitude.

Apart from a realistic commencing celary, the oompany also offer attractive benefits normally associated with major organisations.

Ref. N2/0504

MYRIAD APPOINTMENTS LIMITED
30 Fleet Street London EC4Y 1AA
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PROJECT LEADERS — PROGRAMMERS — ENGINEERS

£13,000 - £18,000

EUROPEAN ASSIGNMENTS

FOR ADVANCED DEVELOPMENT PROJECTS

WE NEED:

PROJECT LEADERS	with previous experience on INTERDATA B/32 and 7/32 with Fortran and Assembler
PROGRAMMERS	with a minimum of 2 years' experience on DEC PDP 11 and LS1/11 with Basic
PROGRAMMERS	with previous experience on INTERDATA B/32 and 7/32 with Fortran and Assembler, or applicable mini computer experience
ENGINEERS	with hardware and software knowledge and 3 years' experience on minicomputers with a knowledge of automatic testing equipment.

Based in Central Europe, you will enjoy travel opportunities, large company benefits, equity participation, permanent Health and Pension schemes.

If you have any of the above qualifications or experience in software/telemetry or scientific systems, contact Derek Ashley or Penny Bailey

Total capability from the MARCOL Group

60 QUEENS GARDENS, LONDON W2 3AF TEL: 01-402 9355 (24 HOURS)

COMPUTER PROJECT LEADER

£7,000

On behalf of a leading British Engineering Company we seek candidates for the above appointment which is based at a major Manufacturing Unit on Humberside.

The successful candidate will be responsible to the Data Processing Manager for (1) assisting other Managers in determining the information requirements needed to improve planning direction and control of the Organisation. (2) directing the design and justification of computer-based systems that will meet with such needs, and (3) reviewing the progress of such projects until they are in production.

Generous assistance with re-location will be provided.

Please write for copy of Job Description and Personal History form:

Chief Executive
Aline Recruitment Consultants
Albion Chambers, 1 High Street
Leighton Buzzard, Beds.

SALES PERSON

—PERSONNEL

SOUTH COAST

Thriving Systems House on South Coast seeks dynamic and energetic sales person to sell contract services.

The successful applicant will have at least 4 years' experience of the Data Processing Industry and a proven record of successful selling although not necessarily in relation to personnel services.

A generous remuneration package will be negotiated. Applications should be made in writing, and should include details of all previous employments related to sales and data processing.

Box 1018, Computer Weekly.

Software Systems Specialists!

...bring your knowledge and experience of Operating Systems and Network Software to ICI in Cheshire...

At ICI Pharmaceuticals Division headquarters in Cheshire we operate a dual processor Burroughs B6700 (upgrading to B7800 is planned), with over 100 terminals with all the large systems software and hardware you'd expect... especially in one of the country's largest pharmaceutical research and production operations.

There is a vital and continuing need to provide on-line systems software support and that's where you come in. We currently require Systems Specialists in the following areas:

Operating Systems
salary up to £7,500 per annum

The successful applicant will be responsible for Operating Systems Support, the provision and support of operational utilities, system performance and monitoring, hardware evaluation and general advice on procedures, etc. Experience of Burroughs large systems, on-line systems and Algol is essential and knowledge of Cobol, DMS2, MCP and systems programming is desirable.

Network Software
salary negotiable

Responsible for provision/support of Network Software, advice and guidance on efficient use of terminals, programming of terminals, evaluation, trouble shooting. Data communications experience and a knowledge of Post Office services and terminals is essential and Burroughs NDL coupled with Algol/Cobol is preferred.

We are situated in a very pleasant part of rural Cheshire, just 18 miles south of Manchester with easy access by road and rail. Salaries and other benefits are excellent, including relocation expenses, bonus and profit sharing schemes, as well as a very active sports and social club.

We place high emphasis on on-going technical training and development and the scope for career opportunities is extremely good – ICI has a reputation for excellence in this area.

If you'd like to give your career a boost – write or phone for an application form to:

Mr. M. Higgins,
Personnel Officer,
ICI Pharmaceuticals Division,
Mereside, Alderley Park,
Nr. Macclesfield, Cheshire.
Tel: Alderley Edge 582828.

We're successful because our staff are

Data Logic operates at the forefront of computing, applying the very latest hardware and techniques to practical commercial problems. We cover the range from mainframes to the smallest computers. We are leaders in the use of microprocessors for applications that not so long ago required far larger machines. Several of our projects involve dispersed networks of ten or more minicomputers.

The exceptional scope of work is important to our staff. We can match their individual experience to their projects. Equally, we can ensure that each project adds to their experience. As computing itself develops, so do they.

Over the past year Data Logic has grown dramatically in size, in scope of work and in reputation. Our expansion has meant unrivalled opportunities for career progression. We are not prepared to promote people before they are ready for it. But when they are ready — and we give all the assistance we can — the positions as senior programmer, senior analyst, project manager and consultant will be there waiting for them.

The reason is simple. We know that we are successful only if our staff are.

Senior Software Staff
(Ref PS/01)

For mainframe, minicomputer and mixed processor systems, usually supporting terminal networks. Increasingly Data Logic's turnkey projects involve minicomputers at multiple sites.

Applicants must have at least five years experience including some work in consultancy, system design or team management. Substantial knowledge is required of either high level language implementation on a leading mainframe or assembler language development on DEC, Data General or other leading minicomputers. We are especially interested in experience of:

- database systems
- distributed systems
- data communications
- telemetry
- operating systems design and implementation.

Salaries will be up to £8,500, with a car allowance or company car for those at the top end of the scale.

There are vacancies at our Greenford, Birmingham and Manchester offices.

Programmers
(Ref PS/02)

For both mainframe and minicomputer projects which include commercial applications, monitoring and control, and scientific analysis.

Applicants should have at least three years programming and/or analysis experience in high-level language or assembler on any leading mainframe or mini. Salaries will be in the range of £4,500 to £6,500.

Vacancies exist in our Greenford, Birmingham and Manchester offices.

Data Communications Support Engineers
(Ref CP/01)

For sales and engineering support roles within Communications Products Division which markets the INTERTEL range of modems and Network Control Systems.

Applicants should have experience either in sales support for data equipment or in design for digital and analogue systems. A degree or HNC qualification is desirable.

Base location will be in Central London but high mobility will be essential and a car will be provided. Salaries will be in the region of £6,500.

Systems Support Staff
(Ref CE/4)

For specialist support roles within our Customer Engineering Division, which provides nationwide field service for terminal and distributed systems, word processors and data communications equipment. The support staff deal with hardware and software, within a diversity of user environments. Each product represents the state-of-the-art in its area.

Applicants should have a degree in electronic engineering or computing science, followed by at least three years work in specialist support with a mainframe manufacturer.

Base location will be Harlow, Essex but high mobility is essential and a car will be provided.

Programmers
(Ref TS/03)

To work on systems software, emulators and advanced packages for applications such as data entry, for Data Logic's PTS100 range of terminal and distributed systems. This is an outstanding opportunity to gain experience in the development of complex high performance standard software.

Programmers will work in small teams, taking considerable responsibility for distinct functional areas of the total system.

Applicants should have one to three years experience of software implementation in high-level or assembler languages. A degree in computing science is desirable.

Location will be Harlow, Essex and salaries will be in the range of £4,500 to £6,500.

Data Logic

Write or call, quoting the appropriate reference:
Kathy Martin, Data Logic Limited, 29 Marylebone Road, London NW1.
Telephone 01-486 7288.

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dep Page 1.34

ICL 1900 OPERATORS

East London to £4200
(inc. gtd. o/t) + BONUS

Our Client, the east London Computer Centre of a large Service Organisation requires operations staff with 6 MONTHS+ 1900 experience. The hardware at present consists of a 1904A running under GIII. A replacement 1904S is planned later this year with a 2960 next year.

The company can offer excellent career prospects to ambitious operators. There are opportunities for proficient staff to move off shift into Programming, Production Control or Technical Support after a period of 2 years.

Other benefits include a quarterly productivity bonus scheme, opportunities for overtime, subsidised staff restaurant, pension scheme, and midweek rest days etc.

For further details call

Mike Hermer on 01.439.7871.

OPERATIONS SUPPORT

Sidcup to £5000

A large International Organisation based in an easily accessible part of N.W. Kent is currently looking for staff at various levels for their expanding technical support department. A minimum of 1 years operating or data control experience is required, preferably with some IBM OS JCL knowledge, although this is not essential.

The installation is linked via a Data 100 network to a large 370/158 running under OS/VS1. The technical support department operates a flexitime system and therefore this is an ideal opportunity for operators to move from shift work into an interesting and demanding days only position.

There is a recognised company career path which includes the possibility of moving into programming in the future. Excellent staff benefits include discount on a wide range of products, staff restaurant, and an active sports and social club, one of the amenities being a swimming pool on site.

For further details call

Mike Hermer on 01.439.7871

[illegible]

Essex/London Borders C£4000

We are seeking an Operator for our Client on an NCR CRITERION. They operate a 256K 8450 running three partitions utilising the B3 operating system. They have both batch and realtime systems with hardware covering Disks, Tapes, two printers and over twenty online terminals including an online Document Reader, Printer and V.D.U.'s.

The applicant should be over twenty years old and have a current driving licence. The shift system operated is on a short three shift basis with limited night work. Staff benefits include an excellent subsidised restaurant and pension scheme.

If you would like to join the small team of operators running this system whether or not you have B3 experience (B1 experience will suffice) please contact Datascene at once.

For further details call

Sean Oreler on 01.439.7871

ALL OTHER MAINFRAMES

HONEYWELL G.COS £4600
Minimum of one years experience for senior operator. Prospects include opportunity to move into programming.

HONEYWELL GCOS £4400
One years experience on any mainframe needed for out of town GCOS site. No night shifts are worked and excellent re-location package.

HONEYWELL OS2000 £5000
Central London company is looking for an OS2000 operator with a year to 18 months experience. There are no night shifts and simple opportunity for overtime.

UNIVAC EXEC 8 £5300
At least 18 months experience required for company in West London operating a 2 shift system.

UNIVAC OS3 £4500
Applicants should have 9 months+ experience of 90/30 range for two shift job (no nights) in West London. Good company discounts apply.

DEC PDP 11/45 £4600
Applicants with a minimum of two years DEC experience and aged 24, or over, are needed for assistant supervisor for a Marchent Bank. Only two shifts and standard bank perks apply.

DATA CONTROLLERS
URGENTLY REQUIRED IN ALL AREAS
SALARIES £3000—£6000

CONTRACTS

FOR

PROGRAMMERS & ANALYSTS

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DATABASE or TELECOMMUNICATIONS

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[illegible]

IBM 370 OS £5400
Deputy supervisor required by large Travel Co. 3 yrs+ OS Experience with some JCL knowledge. Excellent Perks+ Prospects.

IBM 370 OS £5000
Financial organisation requires Senior and Junior Operators. 2 yrs+ experience including good JCL knowledge for the senior post. Perks include mortgage allowance.

IBM 370 DOS C£5000
Senior Operator required by busy and expanding C. London installation. Good career Prospects.

IBM 370 DOS C£4500
Vacancies exist in all areas for operators with 6 mths+ experience in a variety of installations offering a wide range of benefits.

ICL 1900 £4000
City based installation requires an Operator with around 1 yrs experience, preferably on GII. 2 Shifts only plus an Annual Bonus.

ICL 1900 to £5400
Senior Ops and Shift Loaders required by large W. London site. GII experience necessary.

ICL 1900 £5400
Shift Leader with 3 yrs+ GII experience including knowledge of Macroe for manufacturing Co. 2 Shifts only, salary currently under review.

DATA CONTROLLERS
URGENTLY REQUIRED IN ALL AREAS
SALARIES £3000—£6000

PL1 PROGRAMMERS

City to C£6500 + Mortgage

A national financial group require good PL1 Programmers to work on their twin 370/155's & new PDP 11 equipment.
They need around 15 MONTHS experience or more in PL1, COBOL or ASSEMBLER, & would also be willing to retrain in BASIC+ for new PDP 11 work.
Other attractions include Flextime, Bonuses, Subsidised Mortgages, & Loans after 6 months.

Reference PG 14/1

JUNIOR FORTRAN PROGRAMMERS

West London to C£4500

A well known company in the Consumer Industry currently needs several Junior Programmers who wish to build for their own future.
The minimum experience required is just 6 MONTHS FORTRAN programming on any mainframe or mini. Training in Systems Analysis will be provided and exposure to mainframes (an IBM 370/138), mini computers (on Prime 300's) and micro machines, will all ensure a wide range of experience and a 1st class choice of career prospects in the future.

01.439.7871 **Reference HK 14/2**

NEAT 3/COBOL PROGRAMMERS

NCR CRITERION 8450

Essex/London Borders **Salary negotiable according to exp.**

Our Client is seeking to complement their current Systems and Programming team with several experienced NEAT 3 or COBOL Programmers. Applicants should have a knowledge of NCR CRITERION (or CENTURY) hardware and operating systems. The applications cover stock control, branch charging and general administrative support in a retailing environment which can prove to be very challenging and demands quick response to user requirements. Any necessary training will be provided and benefits include a staff pension scheme, and a subsidised canteen, as well as a first class starting salary.
If you would like to take up the challenge or require further information please ring at once.

01.439.7871 **Reference PG 14/3**

COBOL PROGRAMMERS

City to £5300+Mortgage

A major financial organisation with an expanding ICL 2900 system is seeking several COBOL programmers. These positions will be ideal for people with 12 to 18 months experience on any mainframe, and who want ANALYSIS prospects.
The company offers high starting salaries, Season Ticket Loans, Flextime and a Subsidised Mortgage.

Reference PG 14/4

BASIC+/BASIC+2 PROGRAMMERS

City to C£9000

A well known Software House based in the City are currently seeking BASIC+ & BASIC+2 Programmers to work on their growing range of applications, covering both the Scientific & Commercial areas.

A minimum of 12 months Basic+ 2 or 18 months Basic+ is required and any knowledge of DEC Hardware would be advantageous.

The company offers very good salaries with other benefits including a bonus scheme.

01.439.7871 **Reference HK 14/5**

Datascene Recruitment Ltd.
Sceptre House
169-173 Regent Street
London W1R 7FB **01-439 7871**

datascene
Computing Services Association

Datascene International Ltd. Telex: 25851
Sceptre House
169-173 Regent Street
London W1R 7FB **01-439 1856**

ANALYSTS

£6500 p.a.

PROGRAMMERS

£5775 p.a.

BASED IN LONDON

We wish to recruit on behalf of our clients, Analysts and Programmers who would be willing to undertake training in either IMS or 3790 distributive processing techniques. All we request is that you have 18 months' commercial Analysis experience or two years' Programming, preferably in PL/1.

The working environment includes both batch and on-line facilities with varied application areas. Hardware is an IBM 370/158 running under MVS.

The opportunities for technical advancement are underlined by an extensive training programme. Personal advancement is the responsibility of the individual but a career path structure is in operation designed to reward both effort and technical skills.

If you feel you would like the opportunity to advance yourself and have the necessary background, please apply in the first instance to:

DIRECT PROGRAMMING SERVICES
51 Long Lane, West Smithfield
London EC1A 9E1.
Tel. 01-606 1738 (24-hr. service)
quoting ref. MB/11

CAPP ASSOCIATES group provides permanent and contract recruitment services to clients and applicants

SYSTEMS ANALYSTS

Distributed Processing — Development Environment
Start Salaries to £7,500 pa — Between London & Rural Kent

A substantial manufacturing group with its central DP installation at St. Mary Cray is entering a new development phase for the introduction of a distributed processing network, based upon the latest medium sized Burroughs equipment.

The expansion creates a number of interesting opportunities for Analysts to become involved in the development and implementation of new applications, with on-line program development introduced. The initial stages will include the production of accounting systems followed by their integration with order processing and manufacturing systems.

We see this as the outset of a considerable period of DP development for the group, providing attractive career opportunities for those having commercial systems analysis backgrounds. Programming experience is desirable and serious consideration will be given to programmer/analysts wanting to advance.

The company is situated on the very edge of rural Kent, with villages close-by for a relaxing lunch but easily accessed by road and rail. The department is housed in a very modern complex, providing excellent working conditions with a friendly atmosphere.

Substantial results will be achieved in the next year or two — why not contact us now to establish if the opportunities are of interest to you — joining a successful team can make a vast difference to your record. We would like to talk it over with you — the opportunities cover all levels and salaries will be negotiated in accordance with your knowledge — excellent relocation assistance is provided if you have to move home to take advantage of the opportunities.

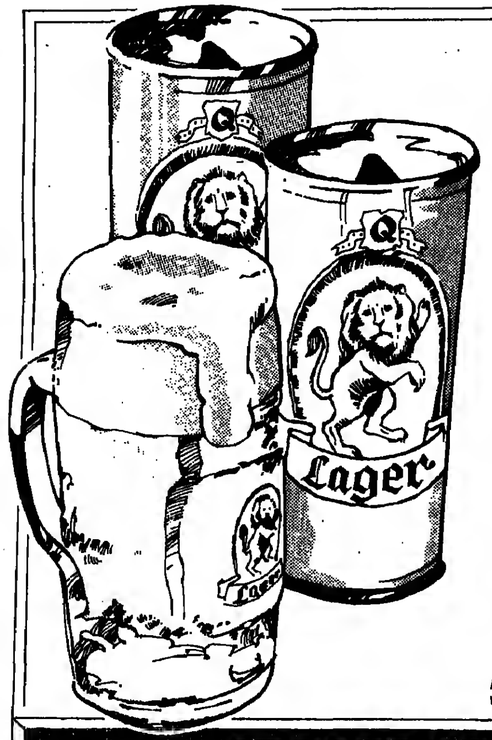
Positions open to male & female applicants, please telephone (24 hour service) for initial discussion or write to address below. QUOTE REF. CW 118-98.

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS

CAPP ASSOCIATES
LONDON AND MANCHESTER

Computing Services Association

01-686 9693
A.N.P. HOUSE, DINGWALL RD
CROYDON CR9 2AU



ICL OPERATORS

change to a London brewery with ICL 2960's and enjoy all the benefits!

One of the major UK brewerles have recently replaced their original ICL 1900 mainframes with two ICL 2960's.

Two operators, with upwards of one year's operating experience on ICL computers, are required to complete the existing operations team. You will be based at our client's West London data centre where three shifts are worked.

As one would expect from a leading brewery, the benefits package is first class and includes a start salary of £4,300 plus a JULY REVIEW, generous paid overtime, excellent restaurant, and ample car parking. Career prospects are good, for example, these two current vacancies have been caused by promotions to the programming area.

For further information (including a data sheet describing our clients computer development) contact REX SCOONES at our Croydon office.

We would prefer you to telephone initially as there are now considerable mail delays at the Post Office.

Positions open to male & female applicants, please telephone (24 hour service) for initial discussion or write to address below. QUOTE REF; CW 116-9S.

COMPUTER AND PROFESSIONAL PERSONNEL CONSULTANTS

CAPP ASSOCIATES
LONDON AND MANCHESTER

Computing Services Association

01·686 9693
A.M.P. HOUSE, DINGWALL RD., CROYDON, CR9 2AU

JBA

Manager of Technical Services
Middlesex/Surrey border — **c£10,000 + car**

This division of a Computer manufacturer require an experienced communicotive Manoger to head-up and control all computer operations, product assurance, documentation and applied technology. The position will allow emple acopa for personal and career development both from a technical and management viewpoint.

Cendidates must olready be managing o technical services group, ideally engaged in financial, banking or accountancy opplications, and be fully conversant with man management and personnel activities.

Wonderful career move for dynamic individual seeking fine prospects in a growing organisation.

Contact: Mike Creamer

Systems Programmer
Surrey — **up to £7,700**

This orgonisation now have their IBM 3032 installed and running under VS1 with plons to introduce MVS within one year. This presents an ideal opportunity for a systems programmer, with sround two years good IBM experiance, to move onto the lotest range of equipment and obtain valuable further treining.

Applicants should be familiar with performance orientated products and have e good understanding of SYSGEN and operating systems. The successful candidate will enjoy an environment of self-defined job responsibility and every encouragement to progress in their career.

Convenient location. Realistic salary, and excellent fringe benefits.

Contact: Mike Creamer

Micro-Business Systems
Edgware, Middx. — **neg. c £7,000 + car**

A superb opportunity for en onslyst/programmer to acquire valuable expertiae in this fast expanding market. The client is doubling the size of the support team which designs and implements micro-based turnkey systems for commercial users, in order to cope with a vast increase in demand - the prospects are therefore truly tremendous.

Essential qualities required are as follows: – A thorough background in commercial applications - therefore the ability to define user requirements and design solutions, sound ASSEMBLER programming experience - preferebly gained on Microcomputers but Mini experience is acceptable, plus the drive and energy to contribute positively to this relatively new applications area.

Company car is likely to be an Alfa - an opportunity not to be missed.

Contact: Andy Wright

Systems Consultants
London Based — **range £6,000–£9,000**

This major consultancy organisation continues to expand its presence in the commercial systems market, being already extremely well known for high level technical expertise it brings to solving clients' problems. Opportunities now exist for additional consultants who can show o sound all-round, d.p. background, encompassing both programming and commercial systems experience. Knowledge of COBOL or PL/1 and on-line techniques plus involvement with retail/distribution/insil order applicatinna would be of particular interest.

Hardware background is unimportant – either IBM, Honeywell or ICL 2900/1 is useful; versatility, flexibility and in-depth d.p. knowledge are the key factors we seek.

Contact: Margaret Stevens

Software Development Programmers
Sussex — **to £7,500**

A progressive and fast growing manufacturing company is seeking to appoint additional softwire designers to augment a small development team. The requirement is for hard working individuals who can make an immediate and significant contribution in this technical environment. Our client is interested in people who can demonstrate experience in the design of compilers, operating systems, data entry applications or communications systems. Virtually all development will be in a high level language therefore experience in ALGOL, BCPL, CORAL or PASCAL is relevant. A sound knowledge of Assembler would be a distinct advantage.

This is a first class opportunity to progress with a highly successful organisation.

Contact: Margaret Stevens

Systems Designers
Bracknell — **up to £7,500**

Our client, a small softwire group in a well established British organisation, have opportunities for Systems Designers to take responsibility for the development of real-time applications.

Candidates must have programming background (e.g. ASSEMBLER, CORAL, RTL/2) and several years in the design of special systems using minis or micros. Project leader experience would be an advantage.

This is an excellent opportunity to work on advanced applications in a small professional environment but with large company benefits which include new offices, relocation assistance, free car parks, etc.

Contact: Jim Baker

For further information on any of the above vacancies please contact the appropriate consultant.
If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES, International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

CONTRACT

1.	PDP/11 ASSEMBLER	Mddx. **£230 p.w.**
2.	ALGOL	Cambs **£240 p.w.**
3.	2904 COBOL (TPS Exp.)	S. Coast **£250 p.w.**
4.	OS COBOL	London Area **£230 p.w.**
5.	RPG II	N. London **£250**
6.	SYSTEMS ANALYST (ICL)	N. London **£285 p.w.**

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DIRECT PROGRAMMING SERVICES
51 LONG LANE, WEST SMITHFIELD LONDON, EC1
Tel. 01-606 1738/1739/1730
(24-hr. service)

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If you can't beat the system join us and produce your own

When the time comes that you feel your abilities are letting, that perhaps you could achieve greater things given a little more freedom for initiative, consider what we have to offer.

We have a vacancy for a:

Systems Development Manager

Product Costing c.£8,500 p.a. plus car lease scheme

The successful applicant will be given the freedom to manage the planning, design and implementation of an advanced product costing system to define the budgeted and current costs of each of our product areas.

The system is to be developed for IBM 370/303X, running under OS, using IMS/DC, PL/I and TSO.

To be the successful candidate it is essential that you have extensive experience of major project design, development and implementation. You must also have had effective experience of Project Management. It is unlikely, therefore, that man or women with less than five years' appropriate experience will be sufficiently knowledgeable to meet the demands of the position.

Preference will also be given to those who have experience of product specification, accounting, business and system processes in a manufacturing environment.

Location will be in the Birmingham/Coventry area and a generous relocation package will be offered, if appropriate, together with large company benefits.

Write today, enclosing comprehensive career details to:

R. Scott, Systems Organisation & Personnel Planning
BL Cars Limited, 2 Eaton Road, Coventry CV1 2GT

Cars Staffs & Services

Technical Consultant Computer Security

Substantial Earnings Package

We are currently assisting a leading organisation with the recruitment of an experienced professional who will play a leading role in the development of systems and software security architecture. This senior appointment will be of interest to candidates with a proven expertise in the following areas.

*Design and Implementation of Mini computer operating systems.

*Computer security/Data protection techniques.

*Communication systems.

THE INDIVIDUAL — Will possess an inquisitive and analytical mind with the ability to develop concepts of systems security from initial design to implementation.

THE QUALIFICATIONS — He/She will have a sound educational background preferably with the equivalent of a Computer Science Degree coupled with several years experience working in a manufacturing or consultancy environment. Alternatively someone from a research or academic field, looking for a unique opportunity to develop his/her skills in a practical environment.

THE FUTURE — In return for the above, the successful candidates reward will be two-fold.

1. A substantial remuneration package from an organisation with the resources to support and market this concept of the future.
2. International recognition as one of the few people to develop the industry 'Standard' in Computer Security Techniques.

For further details of this unique career opportunity contact Ron Oake or Colin Hush on 01-629 7262 and reverse the charges.

Computer Appointments

a division of Graduate Appointments Ltd — 7, Princes Street, London W1R 7RB Tel: 01-629 7262

We've serious business with the best DP Programmers and Analysts...

...a 'state-of-the-art' development with IDEC at Foots Cray, Kent.

Software Development at IDEC is serious business. That's why our interviews are a little more down to earth than most.

We don't expect you to make an important career move on the strength of a quick chat. We're prepared to talk in detail, and at length about the work, the environment and the future we're offering – AND we're prepared to talk money – salaries to match your worth, and that may be more than you think!

IDEC is the software development centre of ITT Business Systems, a highly successful, progressive part of the ITT organisation responsible for some exciting developments in microprocessor-based communications systems. We're out to attract men and women interested in a career in DP oriented software development who want to work in a stimulating, fast moving and creative environment directing the shape of 'state-of-the-art' software design.

If you have DP experience in a commercial environment, you're familiar with a high level language, and are interested in software development, you'll find a meeting with us rewarding. You'll see that we mean business. We'll discuss salaries and explain about all the benefits of working with IDEC at Foots Cray. We'll go in to detail about our offer which includes 23 days holiday, flexible hours, pension scheme and discounts on ITT products. We'll also explain the prospects of career progression in our dynamic, expanding organisation.

If you're serious about a future in software development telephone Chris Turner or Sue Cameron on Potters Bar (0707) 51199 or write to them at the Administration Centre, ITT IDEC, Orchard House, Mutton Lane, Potters Bar, Herts EN6 3AR.

IDEC
A Development Centre of ITT Business Systems

ITT

Want to Join a City Broker?

ICL Cobol Programmer
to move straight into Analysis.

If you have 2 years or more of Cobol and the ability to become a systems analyst you could earn around £6000 p.a. plus annual bonus.*

Cobol Programmer
to learn RPG II.

If you have 15 months Cobol, preferably in an ICL environment you would be taught RPG II at once paid around £5000 p.a. plus annual bonus.*

Our client, Commodity Analysis Limited, is a large, City based commodity broking company literally two minutes walk from three main city stations. They act for a world-wide clientele on all the main international commodity exchanges.

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The APV Co. Ltd., in Crawley, Sussex, is the Headquarters of a highly successful international group of companies engaged in the design and manufacture of process plant for the dairy, brewery, chemical and petrochemical industries.

A vacancy exists for a programmer to work with a team of engineers involved in the development of technology files designed to assist in detailed planning and manufacture of component parts.

This position offers an opportunity for a programmer to become involved in a forward thinking production engineering environment at a time when the need to computerise engineering is only just being acknowledged.

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Candidates must have at least six years in the d.p. industry with four spent in the design and development of commercial applications, possibly as a project manager or DPM. Knowledge of database and real-time techniques would be an advantage.

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For an informal discussion please contact Jim Baker.

JAMES BAKER ASSOCIATES,
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Tel: 01-491 4478.

SENIOR PROGRAMMER

to £6,500

In order to meet the continuing demand for new computer facilities at The Royal Borough of Kensington and Chelsea, the Computer Department is being expanded and a number of new staff are required.

The Hardware/Software configuration is a 1 megabyte IBM 370-138 under DOS-VS, CICS & SPMOL, with 3340 and 2 x 334 disks. Data entry is via Redifon Seecheck terminals, Philips receipting terminals and 3278 Visual Display Units.

The main programming language is COBOL with some RPG and Assembler, and the installation standards are based upon structured design and programming. Program development is via terminal using SPMOL.

The senior Programmer will be part of a project team, and will assist with the technical design of computer systems, design and code programs in COBOL, and give technical guidance to programmers. Applicants should have been in data processing four years and gained a minimum of three years' COBOL programming experience. A knowledge of DOS-VS, Structured Programming and VSAM would be extremely advantageous but is not essential. Ref: CW/308.

TRAINEE SYSTEMS PROGRAMMER

to £6,500

The Trainee Systems Programmer will work in the Technical Support Group assisting with software maintenance, disk space management, development of common modules and enquiry routines.

Applicants should have been in data processing for four years and have gained at least three years' programming experience. Experience in an IBM DOS-VS environment and Assembler is essential. Ref: CW/309.

PROGRAMMERS

£4,500 to £6,000

The Programmers will work in project teams, specifying, developing and maintaining programs written in COBOL and possible RPG II. Applicants should have had a minimum of two years in data processing and have 18 months COBOL programming experience. Ref: CW/310.

GENERAL BENEFITS of employment include 4-5 weeks' holiday depending on seniority, subsidised staff restaurant, season ticket loan and an active Sports and Social Club.

The Royal Borough of
KENSINGTON & CHELSEA

Application forms, quoting appropriate Ref., from: The Chief Personnel Officer, Dept. 151, The Town Hall, Hornton Street, Kensington W8 7NX.
Tel: 01-937 5562 (24 hour answering service).

Application form to be returned by 23rd April 1979.

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Software development expertise is now required to assist with engineering/electronic/scientific systems on mainly DEC PDP 11 equipment operating under DOS or RSX11M. Other mini and micro machines are also utilised and the company has facilities for assembling systems hardware to investigate inter-face problems using simulated inputs. Test rigs are constructed and back-up experiments carried out 'in-house' to ensure smooth operational running.

CIRCA £7000

Knowledge of low-level language is essential for these positions and a relevant qualification (e.g. engineering/physics/mathematics) will be an asset.

Fortran programmers will also be of interest as many projects include mathematical modelling.

Salaries will be commensurate with experience but should not prove a problem to persons wishing to join the company.

Situated in the attractive countryside of Surrey, our client is a highly profitable and successful business, expanding rapidly in Great Britain and overseas. Modern offices are well serviced by three British Rail stations (easy access to the West End of London) and there is a large car park next to the building.

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PROGRAMMER/ANALYSTS

GERMANY/HOLLAND **A1 NEG**

Informatix has been retained by several European services orga...sation... assist in the recruitment of their D.P. staff.

Our clients' current requirements ere for Programmer/Analysts with experience on IBM 360/370, SIEMENS 1000/2000, UNIVAC 494 using COBOL/ASSEMBLER/PL1. A knowledge of IMS would be a distinct advantage.

The conditions of employment are excellent and initial interviews will be held in London over the next three weeks.
Ref: 14/1

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INFORMATIX UNITED KINGDOM AND OVERSEAS INDEX

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There are also some opportunities for

Fortran Programmers

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Contact Roger Andrews, Software Engineering Manager, on Nottingham (0602) 866522 Ext 201 between 10am – 5pm. Please reverse charges. Alternatively, write to him at Digital Technology Centre, Plessey Communications & Data Systems Limited, Abbeyfield Road, Lenton, Nottingham NG7 2SZ.

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		Anal/Prog (Sys. 34)	C £5½K
		Anal/Prog (IBM)	C £6K
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For further information about any of the above vacancies phone or write to Mike Beasley.

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- Computer networking
- Interactive information systems
- Operating system design and development
- Computer graphics
- Multiprocessor system design
- Man/computer interactions
- Microprocessors and their applications
- Speech recognition

The Laboratory's computing services are linked by a packet switched network through which remote terminals give access to main frame machines and a variety of mini-computers, providing users with real-time computation for scientific experiments, high resolution graphics, text processing, etc. Acquisition of an ICL 2972 is expected this year, and it is also proposed to replace the existing network with a new X25 based system.

Candidates, normally aged under 30, should hold a good honours degree, or equivalent, in an appropriate scientific subject. Appointment will be as Higher Scientific Officer (£4,375 - £5,725) or Scientific Officer (£3,110 - £4,600) according to qualifications and experience. Salaries are under review. There are good promotion prospects and a non-contributory pension scheme.

For further details and application form (to be returned by 1st May, 1979), write to Personnel Section, National Physical Laboratory, Teddington, Middlesex TW11 0LW. Please quote Ref. SA/11/MD. If you have already applied to the Civil Service Commission for a post at NPL, a second application will not be necessary.

Science Group CIVIL SERVICE

National Physical Laboratory

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Development of an interactive graphics system suitable for use in a wide range of engineering tasks. CAD applications, and those requiring substantial interactive data manipulation before and after large batch runs, are to be covered. A variety of modern graphics devices are used, including colour raster displays.

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Establishment of a Finite Element software library for use in advanced research. The successful applicant will be an engineer with substantial experience of FE techniques especially for structural analysis.

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For more technical information, ring Cynthia Davis on Abingdon (0235) 21900 Ext. 569 or for an application form and further written details contact Jane Griffiths in the Personnel Group on Abingdon (0235) 21900 Ext. 510.

Alternatively, write to her, quoting reference VN791.

Closing date for applications, 27th April, 1979.

RUTHERFORD
Science Research Council
Rutherford Laboratory, Chilton, Didcot, Oxfordshire OX11 0QX. Tel Abingdon 21900

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Assistance may be given with removal and other expenses and with housing accommodation in appropriate cases.

Casual user car allowance payable.

APPLICATION FORMS may be obtained (by quoting ref. no. C.610) from the Chief Personnel Officer, 186 Drake Street, Rochdale OL10 1XG, to whom they should be returned by 19th April, 1979.

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Don't wonder any more! Call Jacqui Thomas! 01-493 2947 (Office), 01-979 3550 (Home) or fill in the FREEPOST coupon immediately.

P.S. If you are a Systems Analyst looking for career prospects our client would also be interested in talking with you.

To: William Key & Partners, FREEPOST 4, London W1E 8UZ
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We can offer you varied and interesting work within a well-defined but flexible career structure, coupled with a planned training program. Vacancies exist in both our Northern and Southern Divisions.

In addition to a competitive salary which is reviewed every 6 months, we offer a substantial bonus scheme, contributory pension scheme, and free life, health and accident insurance schemes, four weeks' annual holiday, plus generous allowances whilst working on clients' sites in the UK and Europe.

Please phone or write to Trisha Williams at our London Office, or Alexie Hine at our Manchester Office.

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If you are a graduate (or equivalent) in computing or a related subject, and if you have demonstrable experience of programming Mini/Micro based systems and would like to work in a first class environment in Holland then phone us today. Depending on qualifications and experience expect to talk in the salary range of:

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PROGRAMMERS AND SENIOR PROGRAMMERS

The Anglian Water Authority is the largest of the new regional water authorities. Their territory stretches from the Humber down to the Themes.

With responsibility for administering the water resources in a territory of this size, the demand is for the very latest thinking in computer systems and communications to provide effective control and information processing throughout the twenty Divisional Centres.

The Authority's Data Processing is centred round a large Honeywell 66 computer, supporting a variety of local and remote terminals. All applications are Date Base, the majority written in COBOL, although technical work usually uses FORTRAN.

Career Development

Although the requirement is for COBOL programmers and senior programmers the opportunity is for career development. The Systems Department provides really sophisticated facilities for program development. The environment is one of professionalism, with systems developed in a controlled and logical manner, using modern techniques including Decision Table Pre-processors and on-line program debugging.

Challenging Prospects

This is one of the most ambitious projects of its type at present underway in the U.K. The equipment is of the very latest specification. The challenge of providing a computer service for a newly created organisation gives opportunities to work on really interesting projects covering literally all aspects of modern Commercial and Technical applications.

Financial Rewards

The Authority recognises that to attract top people you need interesting work and top salaries. If you think that working in a rural environment means a second class income you will be pleasantly surprised.

We have not quoted salaries because they really do depend on individual circumstances. Perhaps just as important as commencing salary is the fact that there is a very effective ongoing review procedure.

Rural Environment

The Authority's Data Centre which houses the main frame and development staff is in a most attractive purpose built location in Huntingdon. It is on the banks of the River Ouse providing recreational facilities, including boating and virtually all rural activities.

Housing prices are amongst the lowest in the country. There is a choice between old world village accommodation or modern housing developments. The Authority will pay for the removal costs of successful applicants and provide additional assistance during the relocation period.

We cannot emphasise too strongly the attraction of working in this environment. If you have a minimum of one year's experience in either COBOL or FORTRAN, we would like to hear from you and discuss the positions in more detail.

Please contact: Mike Sands.

ANGLIAN WATER AUTHORITY

Computing Services Association

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Alternatively, write to:

ATA SELECTION & MANAGEMENT SERVICES
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Bristol BS1 1NR

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BRISTOL

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c £6000

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SYSTEMS ANALYSTS
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Ideally a business analyst with experience of computerised systems on ICL Hardware Based WILTSHIRE Ref 433.

For further information telephone 0272 211038, alternatively write to:
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36/38 Baldwin Street, Bristol BS1 1NR

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LONDON (01) 637 0781 MANCHESTER (061) 832 5856
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JBA

SYSTEMS PROGRAMMER

Surrey £6,000–£7,700

Our client is a large organisation dedicated to, and using, the most modern mainframe equipment and systems available today. They are currently running an IBM 3032 (4MB) and a 3031 (2MB) with both on-line and batch applications incorporating OS/VSI, VM/CMS and CICS/VTAM, with the installation of MVS and SNA well underway.

A vacancy has occured for an enterprising, relatively junior, Systems Programmer in the Technical Support team. Ideal applicants will already be familiar with performance orientated products and have a good knowledge of SYSGEN and operating systems. Total systems programming experience must be at least two years with an IBM installation of reasonable size.

This is an excellent opportunity for making that move onto the larger more powerful equipment, with the prospect of getting involved in real-time network systems. Good further training is available together with dedicated encouragement to accept responsibility, leading to rapid promotion and salary improvement.
(Note salary range quoted is currently under review.)

Contact: Mike Creamer

JAMES BAKER ASSOCIATES
International Personnel Consultants,
16 Maddox Street, London W1.
Tel: 01-491 4478

United Kingdom Atomic Energy Authority

Harwell Central Computer Service

The Harwell Central Computer services uses an IBM3033 SMP, to deal with a large batch and interactive workload. The interactive facilities include TSO, APL, HUW, Taskmaster, with several hundred terminals of various types being supported. There are also several r.j.e. stations.

A wide variety of computer work is handled, concerned with scientific research, administration, information retrieval, text processing and mini-computer links. Staff therefore have exceptional opportunities to gain experience of the latest computing equipment and associated software.

A number of vacancies exist within the Central Computer Group, for staff to be concerned with:-

Computer Performance - involving the tuning for greatest efficiency of a large computer system. Research into techniques for measurement and estimation of computer performance and workload is encouraged.

Graphics - involving the development of graphics facilities particularly of the interactive type.

User Services - for several hundred customers who require help and advice of JCL, Fortran, PL1 and program efficiency. Manuals and other documentation need to be produced using text processing facilities. Demonstrations of interactive software and terminals need to be carried out.

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Applicants should be qualified to at least HNC level and will ideally be in their 20s or early 30s.

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or write to Miss K. Rout, Personnel Department 'A', Building 329, U.K.A.E.A., Harwell, Didcot, Oxfordshire OX11 0RA. Quoting Ref. CF1.

HARWELL

INTERNATIONAL PROGRAMMING OPPORTUNITIES IN BRUSSELS

Significant career openings for Programmers and Analyst/Programmers with at least two years' experience

Our client, the Blue Bell Corporation, famous as the manufacturers of Wrangler Jeans and leisure weer, have their European heedquarters in Brussels. The Corporation is about to embark on its most significant international computer project to date. They ere installing IBM System 34s, heve placed orders for System 38s end a letter of intent for the 4300 series. The purpose of the project is to develop a comprehensive, integrated informetion system to be instelled in up to twenty of the Blue Bell operating locations throughout Europe. Although the bulk of the development will take place in Brussels, it is anticipated that programming staff will be required to travel to the verious locations to instell the systems.

Without doubt, this is one of the most interesting programming/career opportunities that we have been esked to recruit. The specific requirements ere as follows:

★ Minimum of 2 years' programming experience — edditional experience extremely veluable.
★ You should heve programmed in COBOL. If you heve RPC experience es well, this could be useful.

It is enticipated thet this initiel assignment will spen approximetely two years. At the end of the project, the staff concerned will be redeployed on other projects under development by Blue Bell throughout Europe.

After interviews in the U.K., successful epplicants will be invited, with their wives if appropriete, to go to Brussels to see the location end generelly get e feel for the enthusiesm end dynamism of the compeny.

This is one of thoee occesions where e rere opportunity presents itself — The Job, the Selary end the Benefits of working for Blue Bell ere outstending. We would suggest thet if you ere considering a change of employment, feel thet you heve something to offer and would like to know more ebout the positions described, then either telephone John Goldsmith et his home (Camberley 21266) or Micheel Sends et our office (01-828 5356) or drop e brief résumé in the post.

We will need to be in touch with you very quickly.

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Ref 5:4 A

Int. Banking Institution City of London

Salary: £6K - £9.5K

A prestigious Banking Institution with extensive computing facilities in the City of London, Germany, Switzerland and Italy requires additional Data Processing personnel up to Project Leader level for both its internal systems divisions and its Foreign Exchange activities. The Company's hardware comprises both Mini-Computers and Mainframes installed late 1978/early 1979. The Mini Division essentially requires COBOL or BASIC + Programmers and Business/Systems Analysts preferably from a financial or insurance orientated background. The Mainframe Division has a requirement for PL-1 Applications Programmers who can offer (preferably) a second programming language either Assembler or COBOL. The ability to work as a member of a project team under strict documentation and structured programming standards is vital. An important additional benefit for the more senior positions will be the travel prospects. Candidates can expect monthly travel to one or more of the Bank's other European Data Centres where new hardware and associated software is to be installed very shortly.

Ref 5:4 B

Applications Support Experts Netherlands

Salaries to £16,000

If you wish to relocate immediately to a permanent based career position in the Netherlands please read on... You must offer considerable expertise in two or more of the areas outlined below. Call us immediately since our client is conducting a further series of interviews shortly after Easter. The required areas of expertise are: (a) Quality Assurance, (b) Advising development departments of software usability (c) Pre and post sales support (d) Problem solving on site and in-house (e) Release preparation and (f) Evaluation of new products and techniques. In addition to above average salaries our client will pay full relocation expenses, assist in obtaining permanent housing (which in the case of this Company is more readily available than is usual in the West Netherlands) and will meet the cost of Dutch language courses for the employee and his partner. Of course, a pension plan and a health insurance scheme form an integral part of the package. There are real opportunities for transfer worldwide throughout the Company's organisation.

Ref 5:4 C

Sr. Project Analyst-Managers Thames Valley

Salaries: c £9.5K

A leading commercial organisation with recently acquired IBM hardware requires Senior Project Analysts and Project Managers for its advanced distributed processing plans. Currently, the main computing activities take place in U.K. with supporting Data centres in U.S. and E.E.C. The Company is seeking several additional personnel to conduct an appraisal of its proposed software and project plans within the particular areas of accounting and audit operations. Ultimately, it will be essential to control and monitor both the progress of the total project and also the allocation of staff. Ideally successful candidates should hold a numarate degree and have had five years experiance both within programming and systems analysis/design. Experiance with recent IBM hardware in an on-line environment is a decided advantage, as is the desire to travel during the course of employment.

Ref 5:4 D

Senior Systems Engineers Belgium

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Others (specify)

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Others (specify)

Job Titles
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Systems engineer
Analyst/programmer
Systems programmer
Programmer
Operations supervisor
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Candidates (men and women) must have a degree in computer science or related subject, or have taken the DADPTC Advanced ADP Course, or hold equivalent qualifications. They must also have had 3 years' experience in the application or teaching of ADP.

Starting salary within the range £5000-£7460 according to qualifications and experience. **Salary under review.** Accommodation may be available.

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Ministry of Defence

university of wales

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Interactive Computer-Graphics Facility System Manager

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The appointment will be for up to three years in the first instance from the earliest date that can be arranged. The salary will be on a scale up to £6,050 (under review) plus USS/USDPS benefits, the commencing salary depending on age, qualifications and experience.

Further particulars and application forms (2 copies) may be obtained from the Personnel Officer, University College of Swansea, Singleton Park, Swansea SA2 8PP, to whom they should be returned by Tuesday, April 17, 1979.

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Applications are invited for the post of Computer Operator in the University's Computer Centre. The Computer Centre currently operates a three shift system from 0700 hours Monday to 0700 hours on Saturday. Salary within Computer Operator Scale £2647-£3366 per annum.

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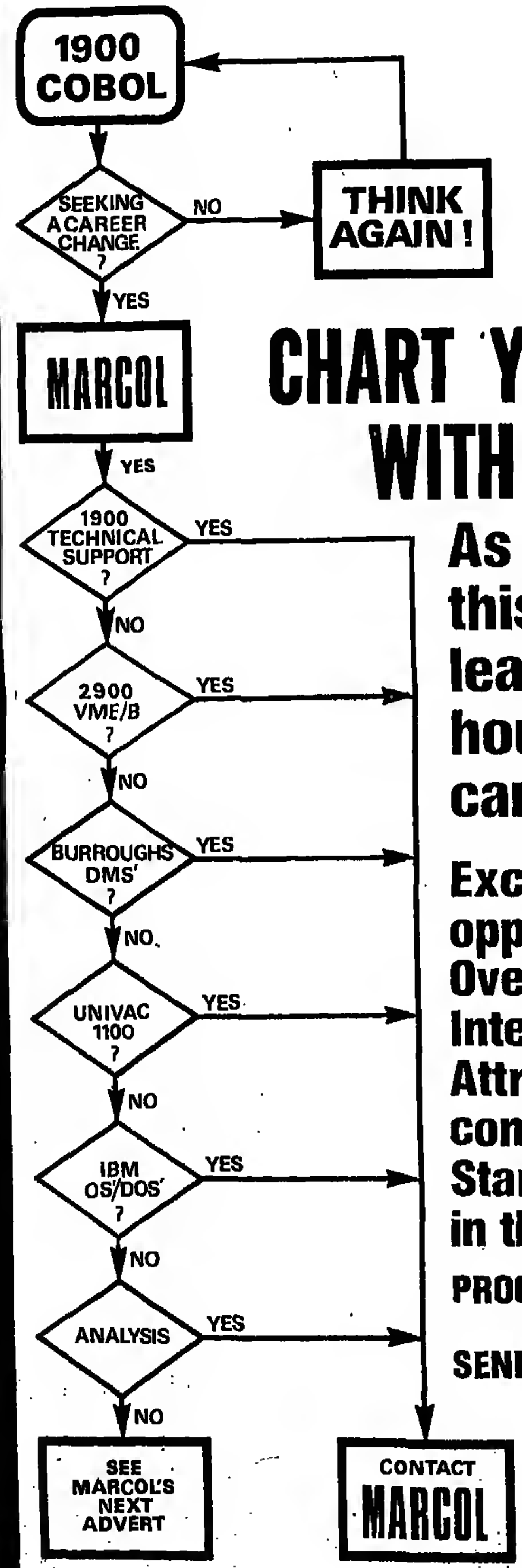

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Interested applicants should forward their resume, marking the envelope "Confidential" and quoting reference no. 1479 to:

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Australia.

Alternatively, should United Kingdom applicants wish to obtain more information, before submitting an application, they should contact Mr. T. B. A. Roberts, M.I.M. Holdings Limited, Adelaide House, King William Street, London EC4R 9DX. (Phone 01-626 7446).
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SALES SUPPORT/ SYSTEMS ANALYST

Recognition Equipment Limited, the leading manufacturer of OCR equipment, needs a self-starter to assist our OCR Wand Sales Manager with many aspects of sales, systems design, installation and customer training.

A knowledge of key entry, POS or retail systems is desirable. After training, you must be able to work with minimum supervision, travel extensively in the UK and enjoy the challenge of joining a small, highly motivated, team of professionals.

Based near London Airport, we offer a good salary together with a generous car allowance. The company is multinational, profitable, and growing rapidly, so that the prospects are excellent. Come and see us.

Call David Billman, OCR Wand Sales Manager, Recognition Equipment Limited, Shirley Lodge, 470 London Road, Slough. Tel: 47774.

GREATER MANCHESTER

SYSTEMS ANALYST to £7000
ICL 1900 installation based in South Manchester. Develop an on-line order entry system. Should have a COBOL programming background.

ANALYST/PROGRAMMER £5500+ Car
ICL 2904 installation. Ideally should have both programming and systems experience, but would consider person with 3 years' COBOL experience. On-line knowledge helpful.

CONTRACT PROGRAMMERS & ANALYSTS to £350 p.w.
Greater Manchester — RPG2 Programmer/Merk IV Programmers/MUMPS Programmers/Business Systems Analysts (IBM/UNIVAC/HONEYWELL).
Overseas — Europe — IBM Programmers (COBOL/RPG2/PL1). Saudi Arabia — 4 x IBM COBOL Analyst/Programmers (tax-free salary, free accommodation, etc.).

To register for these and many other vacancies, please contact Alan Brown (Computer Recruitment Consultant), SENIOR APPOINTMENTS COMPANY, 2nd Floor, Coronation House, Arndale Centre, Market Street, Manchester. Tel. 061-832 4383.

LONDON EHE

Ealing College of Higher Education

LII in Computing

Applications are invited for a lecturership in Computing in the School of Business and Management Studies. The school runs a major Business Studies degree course and a Diploma in Management Studies course, as well as a range of short courses in Management.

Applicants should be graduates, preferably with relevant industrial experience, and above all should be eager and willing to liaise with lecturers in other disciplines to form cohesive business and management courses.

Salary: £4575 to £7032 p.a. inclusive, depending on experience

Application forms and further details from the Chief Administrative Officer (TO/UC), Ealing College of Higher Education, St Mary's Road, London W5 5RF. Closing date: 24 April, 1979.

Ealing EDUCATION SERVICE

UNIVERSITY OF NOTTINGHAM CRIPPS COMPUTING CENTRE

Applications are invited for the posts of

SENIOR SYSTEMS PROGRAMMER
and
INSTALLATION ENGINEER

The University has a linked 1904S/1906A configuration, integrated with a packet switched network, comprising two PDP11/40's (for data preparation and editing), and a Modular 1(to provide interactive OASIC), a Faculty PDP11/34 (providing on-line access and file transfer facilities for remote users) and a PDP11/34 switching node (providing access to EPSS and later to departmental mini computers). The Centre is also actively participating in the development of a new regional network which will fully interconnect the main computing services of the six midland Universities.

For the first post, experience of either PDP11s or 1900 George 3/4 systems is essential. Applicants should normally have a good honours degree or equivalent experience.

For the second post, an experienced engineer with an interest in software is sought to assist in the handling of development problems encountered during the extension of the system. Applicants should have at least HNC, although a degree is preferred, and should also have at least two years' relevant experience.

For both posts the initial salary will be in a range up to £8,655 p.a. (under review), with USS, according to qualifications and experience.

Further particulars and forms of application, returnable not later than 12th April, 1979, from Staff Appointments Officer, University of Nottingham, University Park, Nottingham NG7 2RD. Ref. No. 878

Principal Systems Analyst (F.11)

£6180-£6822 inclusive (Salary Grade PO1(b))

This post ranks second to the Data Processing Manager and provides the opportunity for an enthusiastic and ambitious Analyst to extend his/her experience into Data Processing management.

The successful applicant will have a good general background in Data Processing with at least 3 years' experience as an Analyst including responsibility for the development and successful implementation of major systems.

Some involvement with on-line applications although not essential would be an advantage.

The installation comprises a Honeywell 64/20 with disk and tape, and communications facilities are being planned.

This post attracts 100% removal expenses, generous assistance with resettlement expenses and initial accommodation for married or single applicants where appropriate.

Please write or telephone for a job description and application form: The Personnel Officer, Crawley Borough Council, Town Hall, Crawley, West Sussex RH10 1UZ. Telephone Crawley (0293) 29744, extension 122 (24-hour answering service). Closing date: 20th April.

CRAWLEY
BOROUGH COUNCIL

Directorate of Finance

Operations Controller

AP3/4 £3732 to £4432 p.a.

Applications are invited from senior operators with at least two years' experience of ICL 2903/4 computers. A knowledge of ICL utilities and JCL would be a decided advantage. The current installation is a 32K 2903 with EDS 60's FEDS, LP, CR and 2510 tape unit.

The person appointed will be responsible to the Computer Manager for a small operations section and must have the ability to play an increasingly effective role in an expanding installation.

Bucks County Council covers an area of 200 square miles of attractive countryside situated in the Weald between the North and South Downs. The town has excellent shopping facilities and is easily accessible from London and the Sussex coastal resorts.

Assistance with resettlement is available and includes:
- ★ A staff housing scheme in appropriate cases or assistance with house purchase
- ★ 100% removal expenses
- ★ Disturbance and Lodging Allowances.

Attractive Conditions of Service include:
- ★ Single shift operating
- ★ 5 day 37 hour working week, with flexible working hours
- ★ Generous annual leave
- ★ Sick pay and superannuation schemes
- ★ Free accident insurance at work

Horsham district council

For an application form, which should be returned by 20th April, 1979, please contact the Personnel Department, 5 Blackhorse Way, Horsham, West Sussex. Tel: Horsham 64161 Ext. 271.

D.P. SYSTEMS CONSULTANTS

We are part of an International Group offering a management consultancy service to industry and commerce.

As part of our continuing planned expansion programme, we are seeking the services of one or two highly experienced D.P. Systems people.

It is our belief that computers should work for people and not the reverse. The people we are looking for will be like minded and able to distinguish between the use of D.P. for its own sake and the need to provide a practical workable solution for users.

Applicants should be well-qualified, highly motivated and have experience of the design and implementation of a wide variety of systems and real-time applications.

If you are seeking the opportunity to work with people who get the job done and where the financial rewards reflect this attitude we would like to hear from you.

Give us a call or write in confidence quoting reference MF8321 to:
HANDLEY-WALKER CO. LTD.
[illegible]
Tel: 021 643 9472

Jacquard Systems

Mini-Computer Sales

Territories throughout the UK

£8,000-£10,000 + CAR + commission

AM Jacquard Systems is a rapidly growing organisation supplying mini computer based automated office systems to the business world. Their UK Head Office is in Buckinghamshire, and the equipment which is manufactured in Los Angeles is capable of handling data processing, word processing and communications simultaneously and with equal facility.

A new sales force is being established to cover the whole of the UK and although regional offices will initially be set up for London and Manchester we are keen to hear from candidates in all parts of the country.

An excellent sales record is required, but candidates, male or female, should have a good understanding of commercial business.

Experience in the field of mini computers is essential and you should certainly be capable of reviewing existing business systems and constructing sensible sales proposals.

Basic salaries are attractive, commission limitless, and on achieving quote you could be earning £16,000 per annum.

In the first instance, please send your c.v. to, or request an application form from, Janet Browne quoting reference JB/CW /244.

Jean Dennington Limited
Personnel Consultants,
14 New Burlington Street,
London W1X 1FF.
Telephone 01-734 9134

SENIOR PROGRAMMER

International Banking — CITY £6,500

+ Bonus + Subsidised Mortgage
+ 75p LV's + Free BUPA
+ Personal Loans at Reduced Rates
+ Interest Free Season Ticket Loan
+ Relocation Package.

This IBM 370 site uses CICS-VS, DL/I and COBOL and plans to appoint a Senior Programmer, who, in addition to developing new applications, will assume some responsibility for the generation and maintenance of installation standards. He will be a member of a small and effective programming team.

The Bank has a 4341 on order and an interesting development plan. Conditions of employment are at least equal to what you would expect of a major international bank and include a salary which will be negotiable around £6,500. The job represents a very good opportunity to broaden your technical and commercial experience.

Contact: TONY BAKER by 'phone (01-499 4501) or Letter at the address below

Ref: RW14/1

PROJECT LEADERS

W. London **c £8,500**

1. OPERATING SYSTEMS SUPPORT
2. APPLICATIONS SUPPORT

A leading manufacturer is about to establish the support organisation for its new mini-computer division. The management wishes to make the first two senior Technical appointments now.

The individual responsible for **Systems Software Support** will have several years' experience with systems software, notably operating systems and Peripheral handlers, and will be fluent in Cobol, Basic and Assembler.

The main responsibility will be maintenance and support of the company's software products, and the development/procurement of additional products.

The person appointed to the **Applications Support Role** will have performed a similar function with another manufacturer. His/her background must include several years experience with the manufacturing and distribution industries.

Responsibilities include definition, procurement and support of applications software products.

Both positions offer the opportunity to build your own department and progress through management.

Contact: TONY BAKER on 01-499 4501

Ref: RW14/2

hutchinson-scoggins recruitment
47/48 New Bond Street *(entrance in Maddox Street)* London W1Y 0HE Telephone 01-499 4501

Situated in N.W. Kent, and with a significant lead in the expanding Telecommunications field, our client is currently at the forefront in developing micro-processor based private telephone exchanges which will broach new ground in many areas.

Mini/Micro Programmers £5000 to £8000

There is an immediate requirement for at least 2 Programmers to become involved in the development of the live Operational Software for this Real-Time Project.
You should have a minimum of 12 months' experience on either mini's or micro's using either HIGH or ASSEMBLER level languages, ideally gained within a Real-time environment.
Although these are Operating Systems for micro-processors, much of the compiling, linking, testing and simulation will be done on IBM mainframes, thus offering a great deal of variety and interest as well as valuable exposure to a wide range of DP experience.

To find out more about these challenging and rewarding positions, call DATASCENE, and ask for PHIL GASCOIGNE.

Datascene Recruitment Ltd
Sceptre House
169-173 Regent Street
London W1R 7FB

datascene 01-439 7871
24 hour answer phone

The Polytechnic of North London Computer Service

USER SUPPORT PROGRAMMERS

Vacancies exist to strengthen and enlarge the advisory team which offers support to computer users throughout the Polytechnic. Contact with students, staff and research workers over a wide range of disciplines and applications is involved, and some specialization would be encouraged. Experience or interest in computer-aided design, architecture, electronics, business systems or social sciences would be particularly welcome.

For the post at Senior Programmer level, sound experience of interactive systems and high level languages is desirable. For the Programmer post, depth of experience is less important than ability and enthusiasm, and we would consider recent graduates or final year computer science students.

The hardware
Dec-10 KL processor (512K) with 600 megabytes of disc storage and a full range of peripherals and interactive terminals.

The salary
This is on scale (including London Allowance)

Senior Programmers to £6643
Programmers to £4669

WE WOULD ALSO LIKE TO HEAR FROM EXPERIENCED PROGRAMMERS INTERESTED IN PART-TIME ENGAGEMENTS (FOR EMPLOYMENT DURING ACADEMIC TERM TIMES ONLY) AT RATES PRO-RATA TO THE SENIOR PROGRAMMER SCALE.

SENIOR PROGRAMMER ADMINISTRATIVE SYSTEMS

On Year Appointment
c £6000

The Polytechnic of North London Computing Service wishes to appoint an experienced Programmer to be responsible for the transfer of existing administrative systems (written mainly in Cobol) to the new Dec-10 Computer. Work will range from the writing of Macro and COBOL modules through to user liaison and systems implementation. This is an important 12 month project offering varied and interesting experience in an academic environment. Some lecturing, at additional paid hourly rates, may also be available to suitable applicants.

Further information and application forms from the Head of the Computer Service, The Polytechnic of North London, Holloway Road, N7 8DB. Tel: 01-607 2789, ext. 2295.

We are part of the Aviation Division of Smiths Industries Ltd., the leading manufacturers of avionic instruments and systems. We have the following vacancies at our Basingstoke site:

Systems Analyst

This is an opportunity for a person between 22 and 30 years of age with preferably a degree or equivalent of a business studies nature.

Systems experience of not less than one year, in one or more of sales order processing, accountancy, materials management and production control.

Section Leader Marketing

If you can supervise sales and order administrative functions; give support to a busy technical sales team and provide statistical and/or financial analysis. If you also have a minimum of 5 years' sales office experience preferably in a light engineering environment with a G.C.E. standard in English and Maths.

If you are interested in working for a progressive company which offers excellent salaries, holiday, sickness and pension schemes, then write giving details of previous experience or phone to:

Sid Prestidge, Personnel Officer
Smiths Industries Limited,
Aviation Division
Winchester Road,
Basingstoke, Hants.
Tel: Basingstoke 3191 ext. 242.

FORTRAN

FOR THE BEST JOBS IN THE SCIENTIFIC AND TECHNICAL COMPUTING FIELD — CONTACT US NOW

As specialist agents in the Engineering, Scientific and Technical industry we now deal with over 4,000 companies throughout the U.K. There is an urgent demand from these companies for experienced and Graduate programmers with FORTRAN experience. Jobs from £3,500 to £8,000 all areas. Phone us now for a free list of vacancies.

Capital Appointments, 26 Windmill Street, London, W1
Telephone 01-637 [illegible] (24hrs)

Systems Analysts
WATFORD

The Job
We are now looking for Systems Analysts to work on systems which cover manufacturing – production control and scheduling; product support, concerned with giving our customers an accurate and reliable spares service; and financial and accounting systems. We are also considering new systems and, if allocated to a specific project, you will be involved in the full development cycle from feasibility study through analysis, design to post implementation, the responsibility extending to program specification level.

The People
For people with systems experience preferably in financial, manufacturing or distributive systems, this represents a chance to join a thriving company and work in a sophisticated environment backed by technical resources and personal development programmes that are respected wherever your career may ultimately lead you.

The Equipment
Rolls-Royce, Leavesden, operates an IBM 370/138, 1Mb under DOS/VS with POWER/VS, CICS/VS, DBOMP and DL/1.

The Company
Rolls-Royce has had a record sales year with deals signed in 1978 that could be ultimately worth more than £2,000 million. Here at Rolls-Royce Aero Division we are engaged in the design and manufacture of a range of gas turbines for hovercraft, light aircraft and helicopters, both civil and military, including a major order programme for Westland Helicopters. For the computer specialist the impact of our recent successes is more subtle. It clearly requires a much increased emphasis on computer based design and control information systems in order to mount the highly complex design and manufacturing programmes needed. But less obviously it also creates that all important buoyant climate where new thinking and projects can thrive in a well motivated atmosphere.

The Benefits
* Highly competitive starting salaries
* Annual individual performance award system
* Quarterly productivity bonus
* Excellent sports and social facilities

Please apply with brief career details or telephone for an application form quoting reference CW/60 to: Peter Banton, Rolls-Royce Limited, Aero Division, Leavesden, Watford WD2 7BZ. Tel: Garston 70935.

ROLLS ROYCE AERO DIVISION

ADVANCE YOUR CAREER AT EURO EXHAUST CENTRES LTD

(Compensation packages at up to £9k)

Europe's leading company in the retail exhaust field is now planning fundamental developments in its D.P. activities to satisfy the increasing information needs of this successful and expanding business. Accordingly, a number of important and exciting job opportunities have arisen which will be of interest to progressive professionals who can help move the company from its dependence on bureau support and a small in-house ICL 2903 installation to self-sufficiency based on the more appropriate and up-to-date equipment.

The company is particularly keen to meet people who believe they have a contribution to make at the following levels:

Project leaders or system analysts with a financial, stock control or OR background.

Senior programmers with proven experience in COBOL or RPG 2 ideally gained in an ICL 2903 or 1900 George 2 background.

Less experienced or junior programmers with the motivation, ability and background to develop in an expanding young installation.

Applicants should, in the first instance, send relevant details to Mr. R. V. Baker at Euro Exhaust Centres Ltd., Torrington House, St. Albans, Herts.

THE CITY UNIVERSITY
Department of Physics

Temporary Lecturer in Digital Electronics

Applications are invited for the above post, tenable for three years from September, 1978, from good honours graduates with a knowledge of modern digital electronics, microprocessor techniques and applications, and of programming at assembly language level. A higher degree and teaching or industrial experience are desirable.

The successful applicant will teach on the recently revised Physics with Electronics BSc course and will undertake research.

Salary will be on the scale £3,883 to £7,784 (under review) p.a. plus £502 London Allowance. Further particulars are obtainable from the Deputy Academic Registrar, The City University, Northampton Square, London EC1V 0HB (telephone 01-253 4399 Ext. 338).

Please quote ref. P7244/CW. Closing date 10 May, 1979.

PAISLEY COLLEGE
DEPARTMENT OF MATHEMATICS AND COMPUTING

COMPUTING: SENIOR LECTURER

Applicants should have substantial experience in relevant fields of Computing, Computer Science or Control Systems and currently be active in developing research or industrial consultancy.

COMPUTING: LECTURERS (TWO POSTS)

Applicants should have specific interests in Computing, Computer Science or Control Systems at honours level and preferably in at least one of: data bases, communication networks, process control.

Consultancy/research involvement is expected.

Salary will be within the ranges:
Senior Lecturer £7,[illegible]-£8,042
Lecturer £4,056-£7,[illegible]

Application forms and further particulars [illegible] from Establishment Section, PAISLEY [illegible] TECHNOLOGY, High Street, Paisley [illegible] 041-887 1241).
Closing date: Friday, 27th April, 1979.
Please quote Ref.: CW

VICTORIA APPOINTMENTS LIMITED
FOR THE BEST JOBS IN THE NORTH DON'T DELAY - PHONE VA TODAY!

NEW INSTALLATION

MANCHESTER IBM

SYSTEMS ANALYST	Salary up to £7,000
ANALYST/PROGRAMMER	Salary up to £5,250
SHIFT LEADER	Salary up to £4,200 + s.a.

Our Client, a Manufacturing Group, is shortly due to install an IBM 370/138 under DOS/VS with CICS and DL/1. They now require a Systems Analyst to be responsible for the detailed design and implementation of new Computer systems, with particular emphasis on Production Control.

The successful candidate will have approximately 2 years' Production Control experience in Systems Design, together with the ability to liaise at all levels.

The Analyst/Programmer will be experienced in Systems Analysis and COBOL programming. He/she should have experience in setting up and maintaining data bases and data comm. using IBM hardware/software, preferably in Manufacturing Industry.

As Shift Leader, you should have a minimum 3 years' operating experience preferably with IBM equipment, with knowledge of JCL. The installation operates a 2 shift system.

While IBM experience for all these vacancies is preferred, full and detailed training is available. This is an excellent opportunity to join an exciting phase of this client's development.

Relocation expenses where appropriate. Ref. 70379

For an application form in respect of these and many more vacancies, contact Miss Val Halliwell.

VICTORIA APPOINTMENTS LIMITED, 24 MOSLEY STREET, MANCHESTER 2
061-236 7319 (24-hour Answering Service) and 061-236 7417. Home 440 8134

Microprocessor Software Design
Tayside, Scotland

NCR is the number two computer systems company world-wide.

A major part of its success is derived from microprocessor based special- and general-purpose terminals.

At Dundee we have developed a highly successful self-service banking terminal.

We now need additional Microprocessor Software Designers (male or female) of one to five years' experience to design new self-service terminals and to help determine the architecture of the next generation of terminals.

The people we require will be experienced in

- Assembler programming
- Mini/micro operating systems
- Communication Software

The rewards at NCR include a negotiable salary, 35 hour week (paid overtime at premium rates), pension and life assurance schemes, generous relocation assistance and the possibility of U.S. travel.

At our unique location on the coast, close to all the premier Scottish golf courses, with ski slopes on the horizon, we offer a quality of life second to none.

In return, we expect professionalism, dedication and sheer hard work.

Interested? Then please write, giving brief career and personal details to:

Ian Hume,
NCR Ltd. Engineering & Manufacturing
Kingsway West,
Dundee DD2 3XX.

NCR

HEWLETT PACKARD 3000 PROJECTS

CONTRACT — TO £350 P.W.
PERMANENT — TO £9,500 P.A.

Programmers, Analysts and Project Leaders/Managers with at least 6 months' experience using HP3000 COBOL under MPE are urgently required to join a small specialist group to design and implement a variety of commercial systems for our user clients.

Send you C.V. immediately or ring Jim Fort on:

01-353 7141

Ref. J2

Hutton
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PORTSMOUTH POLYTECHNIC
Computing Centre

Applications Programmer

Post No. 777

We have recently installed an ICL 2960 and an ICL 2904 to provide a wide-ranging computing service to the whole Polytechnic. The Computing Centre seeks to recruit a programmer of graduate or equivalent qualifications, and some previous experience, who wishes to increase his/her experience by working on a variety of applications both scientific and/or administrative, based on advanced computing facilities. There is a wide range of projects now being started including graphics software, implementation of the IDMS database, and software to support minicomputers linked to the 2960.

Salary Scale: AP2/4 up to a maximum of £4,832 including supplement

Application forms are available from Staff Office, Portsmouth Polytechnic, Alexandra House, Museum Road, Portsmouth, or by telephoning Portsmouth 27681 Ext 317, and should be returned as soon as possible.

FIELD SERVICE ENGINEER

NEW OPPORTUNITIES

Major benefits
- Salary £6,000 plus car
- Paid overtime and standby
- 2 Bonus schemes
- Non-contributory pension scheme/free life insurance
- 3 months formal training (some in Europe)
- New branch office
- Relocation expenses

The above benefits are offered by one of the world's leading Mini Computer manufacturers.

This new branch office is one of a number expected this year as a result of the continued growth of this dynamic company. If you have good academic background/computer experience and are seeking a stimulating environment in which to develop your career. Live in London, Home Counties or West. Call now.

AB EXECUTIVE (KINGSTON) LTD. 01-549 6442

SYSTEMS ANALYST/PROGRAMMER

ISS Compuguard based in Reading, are looking for a go-ahead person with an in-depth knowledge of Digital Equipment Corporation RSX11M operating systems.

The candidate should have preferably had experience in direct digital control applications, as the job will involve new spheres in the control industry using progressive technology.

Generous benefits will be given such as health and life insurance

Please telephone Dennis Caddy. Day — Reading 586043. Night — Reading 690228.

More room in a bigger pond!

For computer professionals in technical support £5000-£7500

Our strong expansion continues in this highly competitive market. In 1978 the ICL Group's turnover was up 22% to over £500m, with a growth in pre-tax profit of 24%.

Consequently further opportunities exist in our newly-structured UK Marketing Division for a whole variety of computer skills to support the wide spectrum of our users. A thorough product training will be given as required.

Bigger Company

ICL is already Europe's leading computer manufacturer. Its technological innovations have gained worldwide recognition particularly the 2900 Series and more recently the Distributed Array Processor. The Group's market base covers 80 countries around the globe.

Brighter Opportunities

We have openings in pre- and post-sales activities with close customer contact. We are therefore seeking technical support staff with specialist skills in software and applications or DP knowledge of particular industries.

Our appointments range from North-East Scotland to the South Coast, both at ICL offices and on customer installations. We have substantial requirements in and around the following locations, where interviews will be arranged:

London **Birmingham**
Manchester **Edinburgh**

Relocation assistance is available.

Broader Variety

Our equipment spans the entire range of customers' requirements from the small 1500 Series through System Ten, 2903/4, System 4 and the 1900 range to the largest 2900 machines and DAP.

You will be working in an exciting, constantly developing environment with the intellectual stimulation of being alongside some of the best people in the industry. We are particularly looking for specialists in:

Operating Systems
MAC/TP/RJE
Languages and Compilers
Data Management
Transition

Better Training

The right technical ability plus an outward-going personality is more important than proven skills on our equipment. We have a number of training centres with an excellent reputation for both technical and management training. The largest, at Windsor, has a training staff of 150.

If your present environment is restricted and you are looking for something bigger and better with more variety and prospects, all this adds up to a first-class opportunity to move to that 'bigger pond'.

For further information, telephone (reversing the charges) the ICL United Kingdom Division Recruitment Office on 01-788 7272 ext. 2669 or 2273 and ask for Barry Underwood or one of his colleagues anytime between 9.30 am and 6.00 pm.

Alternatively write to him, with full details of your experience, quoting Ref. CW1343 at UKD Recruitment Centre, ICL, Bridge House North, Putney Bridge, London SW6 3JX.

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ICL

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Britain's first and largest retailers of Micro Computer Systems invite applications for the posts of

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at their Ilford, Birmingham and Glasgow stores. Excellent opportunities for the right persons, some knowledge of the computer industry

SENIOR PROGRAMMER

UP TO £6,555 **GUILDFORD, SURREY**

FEATURES
- —ICL 2904 Computer with two F502 terminal processors
- —Batch Data Processing and on line interaction
- —Cobol Programming
- —New systems required for library book orders and loans

TASKS
- —Write, test and implement complete programme suites
- —Documentation and Maintenance
- —Assistance with System Design

BENEFITS
- —4 weeks' holiday plus 15 additional days
- —Pleasant environment on University Campus
- —Excellent Catering, Sports and Social facilities

CONTRACT
- —For more information, or to arrange an informal visit Tel: Alan Hill, Guildford 71281 ext. 730

APPLICATIONS
- —For an application form, write to the Staff Officer, University of Surrey, Guildford, Surrey GU2 5XH, or Tel: Guildford 71281 ext. 482

Easter Holiday

CLASSIFIED COPY

Advertisements for the following issues should be sent as early as possible.

April 12th

Bulk of copy by 4 p.m. Friday, 6th April
by 3 p.m. Monday, 9th April latest

April 19th

Bulk of copy by 4 p.m. Thursday, 12th April
latest by 11.30 a.m. Tuesday, 17th April

Your help and co-operation will be very much appreciated, further details can be obtained from ... David Abbey, 01-261 8016, Telex number 25137.

Identify your objective: then go flat out until you achieve it.

You'll find that single-minded formula at the root of most successful sales careers.

And at the root of Systemsolve's sales philosophy.

It's one of the reasons why sales of our ICL-orientated systems, packages and turnkey deals are really taking off. And why we've doubled our turnover each year for the last three years.

And why we're now looking for men or women to handle very specific sales assignments.

We're as single-minded about selling as you are.

As you'd expect, you'd be responsible for a geographical area.

But more significantly, you'd also specialise in a specific business area, UK wide. For example, you could set your sights as our specialist on all publishers in the country.

So you can see what we mean when we say single-minded.

Surprisingly, we're quite open-minded about the sort of people we reckon could handle these roles.

Most probably, you'll be in selling already, with an impressive record that leans strongly to a specific business area, for example, manufacturing systems.

Or you could be an analyst, burning with the conviction that your future lies in selling.

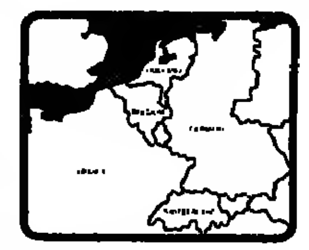
Either way, you won't go short on rewards. We're talking about £6500 absolute basic, with a guaranteed commission for your first six months. More realistically, your on-target earnings will be around £14,000. We'll give you a car such as a Capri or a Cortina 1.6 GL, and five weeks holiday.

If you're single-minded about your sales career, wouldn't you be better off with a company that thinks the same way?

Phone Peter Wemyss on Sunbury 80333, or write to him at Systemsolve (Computer Services) Limited, Pyrene House, Sunbury-on-Thames, Middlesex.

Systemsolve

IBM European Assignments



with CDS, an established consultancy with offices in the UK & Switzerland. These assignments are representative of our contracts with internationally respected clients, and are on a 6-monthly renewable basis.

Senior Consultant

to examine and report on the current Management Information facilities of a multinational company in the Netherlands and prepare recommendations for providing a more useable and responsive service.

IMS Specialist

to work as a member of a database group for an international company in Holland. As well as acting as advisor to application development groups duties will also include the development of IMS support software.

PL1 Programmer/Analyst

to be responsible for all phases in the development of improved software aids for a conversion project in Holland. Duties will include feasibility, specifications, programming and implementation and applicants should have solid experience of both PL1 and OS/JCL.

Programmers PL1/CICS, COBOL/CICS and COBOL/DL1

to work in Brussels on a variety of commercial application development projects. Applicants must have solid experience in one of the above-mentioned categories and should be capable of working with the minimum of supervision.

TOP EUROPEAN RATES

For further details contact Brian Bidston at CDS, or on 03446 5385 evenings/weekends

CDS

2 The Courtyard
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IBM EUROPEAN ASSIGNMENTS

Software and Microcode Development

• Technical Challenge • Stimulating Environment
• Wide Range of Projects • Successful Company
• State of the Art • Career Development
• Financial Reward • International Opportunities

We could go on and list many more of the prime attributes of your next job but we feel that if you are already a systems programmer or microcoder you will probably know that ICL can more than meet your requirements.

At Bracknell we are involved in the development of a wide range of projects that will probably surprise you in their diversity and novelty. We need to recruit more people to help us to continue with our work and will be holding two open evenings, as detailed below.

The experience we are looking for will certainly be well rewarded (the salaries for these vacancies can go as high as £9000) and we have the additional attraction of a Self Financing Productivity Bonus Scheme.

If you are already involved in system software or have good applications experience you should certainly give us the opportunity of meeting you.

If you are an engineer with a bias towards microprocessor techniques we would also like to talk to you about your conversion to microcode writing.

We look forward to seeing you!

Informal Interviews

LONDON
Tues. 10th April
Royal Garden Hotel,
High Street,
Kensington, London W.8
Anytime between 5.00pm-9.00pm

BRACKNELL
Wed. 11th April
ICL,
Lovelace Road,
Bracknell, Berks.
Anytime between 5.00pm-9.00pm

If you can't make either of these dates, then please ring me, Peter Mills, on Bracknell (0344) 24842 ext. 2169 to arrange an alternative time. Or if you prefer, simply post the FREEPOST coupon.

FREEPOST – no postage necessary. Just write to:
ICL, FREEPOST (Ref: CW 1329) Lovelace Road, Bracknell, Berks RG12 4SN.

I would like to know more about Software and Microcode Development.

Name
Address
Tel: Day
Tel: Evening

International Computers
think computers – think ICL

ICL

PORTSMOUTH POLYTECHNIC
Computing Centre

Senior Systems Programmer

POST 772. Salary up to £6,500

The Centre seeks to recruit a person to lead a small, enthusiastic Systems team, engaged in a wide variety of systems design and maintenance projects. The main user service is supplied by an ICL 2960 mainframe running currently under VME/B together with an ICL 2904 machine using MINIMAC, and a switchable terminal network is now being connected in order to expand the user service

Additional commitments of the team include work on a PDP11/40 using RSX-M and some microprocessor research applications in association with academic staff

Applicants should, preferably, be graduates with some considerable experience on the new range of ICL machines, although these conditions are not exclusive

Application forms are available from Staff Office, Portsmouth Polytechnic, Alexandra House, Museum Road, Portsmouth or by telephoning Portsmouth 27681 extension 317 and returned as soon as possible.

ELLESMERE PORT AND NESTON BOROUGH COUNCIL
BOROUGH TREASURER'S DEPARTMENT

SENIOR SYSTEMS ANALYST

Grade SO1/2 £5,232 - £6,060 (inclusive of supplement).

The council operates a 48K ICL 1901T with magnetic tapes and discs and three 7500 Terminal Systems. The system is running under the George 1 plus operating system and communications manager. An ambitious development plan is under way with the emphasis on the provision of inter-active facilities of both new and existing systems

The successful applicant will have extensive computer experience, not necessarily confined to ICL equipment, with at least two years as Analyst. Local Government experience is desirable, but proven ability to design and implement major systems is essential particularly in the area of on-line applications. Preference will be given to members of the B.C.S. or other appropriate professional qualifications.

Application forms and job descriptions are obtainable from: B. A. Lucking, Management Services Officer, Whitby Hall, Ellesmere Port, South Wirral L65 6DY. Tel 051-355 5665, ext. 60.

Closing date: 6 June, 1979

Canvassing disqualifies.

SNR. DP POST — To £8000
Small systems development department in expanding subsidiary company of multi-national organisation require a self starter able to work without supervision with experience of DOS, COBOL, CICS or DL1 Systems programming experience is also valuable. The successful applicant should have sufficient expertise to provide full technical support to members of the team who have no IBM experience. Systems programming will be a minor duty of this flexible position which may also include programming, systems analysis and project leadership, according to the experience and inclinations of the applicant. SLOUGH

SYSTEMS ANALYST — To £7700
3 years commercial DP experience and 1 year's COBOL programming experience are necessary for this post. The duties include investigation, analysis and documentation of new systems, as well as organising system change over, monitoring their parallel running, following-up newly implemented systems and systems testing. WEST END

SOFTWARE ENGINEERS — To £7500
A degree and two years relevant experience are required to work on real-time computer systems currently used in telecommunications applications. Languages used include Assembler, CORAL and ALGOL, both 60 and 68. Training given as required, both on-and-off the job. Excellent prospects of career advancement. Relocation expenses paid in full. Some vacancies for people with experience of computer simulation systems architecture. NR SLOUGH.

ANALYST/PROGS. — To £6820
At least one years' COBOL experience and 'A' level education standard is required. Duties will include systems design and program specification. Some maintenance work involving cost/time estimates and the implementation of systems amendments as requested by users will be expected. WEST END.

ANALYST/PROG. — £6500
The successful applicant must have a knowledge of COBOL and financial applications, and will probably be in his/her late twenties. To work with ICL 2904/96K hardware. CITY

O.R. ANALYSTS — C. £6500
A numerate degree, 18 months experience in O.R., and competence in FORTRAN programming are required to work for this prestigious company. Experience with use of mini computers or time-sharing would be advantageous. WEST END

COBOL PROG. — To £6000
Programmer experienced in COBOL and on line required to work on financial applications. Knowledge of PLAN and advantage. The company offers a profit sharing scheme, a subsidised restaurant, a contributory pension and paid overtime. CITY

COBOL PROGS. — To £5940
6 months COBOL programming experience. A levels and 1 year's commercial experience are essential. Duties include development and implementation of programs and some maintenance work involving user liaison. 20 days holiday, free luncheon club and other financial incentives are provided. WEST END
We have various vacancies for systems analysts and programmers throughout London and the Home Counties. Please phone for an application form.

AMES PERSONNEL
Employment Agency Suite 14, Dryden Chambers, 119, Oxford Street, London W1R 1PA Tel: 01-434 1106

Guardian Royal Exchange Assurance

LYTHAM ST. ANNES

Set in pleasant surroundings in a modern office block, the computer centre is the hub of all the company's Data Processing operations. One of the country's leading insurance groups, we are involved in a wide spectrum of advanced project development and offer job security together with first class working conditions, facilities and prospects. Our present equipment includes a 3032 and an Itel AS5. We use IMS/VS extensively, run under MVS and TSO is being introduced.

Application Programmers and Junior Application Programmers
to £5,300+attractive benefits

With a minimum of one year's programming experience to work primarily in PL/1 (we are prepared to retrain successful candidates using comprehensive training facilities including the latest multi-media techniques). Programs are developed using modular and structured programming techniques.

Systems Programmers
to £6,700+attractive benefits

We are looking for good systems programmers with experience in some or all of the following areas: MVS & JES, IMS/DC, VTAM & VSAM, TSO/SPF, PL/1 & assembler.

Systems Analysts
to £6,700+attractive benefits

To join project teams developing a wide variety of applications using the latest techniques including database and teleprocessing. The ability to deal with users on the one hand and experienced programmers on the other means that the successful candidates will enjoy a high level of involvement and will need to display a professional approach in a professional environment.

Being a large installation heavily involved with database operations and currently evaluating large scale distributed processing networks, we offer many opportunities for career advancement in programming, systems analysis or software specialisation.

Progress is reviewed regularly and promotion to senior grades is based solely on merit. Salary scales exceed £7,500 for the more senior analyst and programming personnel.

Benefits include: • Mortgage facilities at low interest rates and relocation expenses (in approved cases) • Flexible working hours • Paid overtime • Security of permanent employment in a long term career with good promotion prospects • Non-contributory pension, widow's pension and life assurance schemes • Excellent sports and social facilities • Easy access to the Lake District, North Wales and Yorkshire Dales.

Are you interested? If so ring me (reverse charges) up to 8 p.m. Monday to Friday (till Tuesday 10th April) or write giving career details to:
Alan Fourt, Data Processing Department
Guardian Royal Exchange Assurance Limited
Hallam Road, Lytham St. Anne's, Lancashire FY8 4JZ
Telephone Lytham (0253) 738701

Hallmark Associates (Computer Services) Limited

SENIOR OPERATOR
£4500

An expanding bureau in Woking require an experienced person for a senior position in their operations department.

★ Experience — up to three years on IBM equipment, preferably using DOS/GRASP. The position is ideal for a person looking for their first promotion.

★ Prospects — this company offers a wide range of activities using IBM360 and various mini computers. The scope is tremendous but you must be adaptable.

Bill Tilbury, Operations Manager
Hallmark Associates
15/27 Goldsworth Road, Woking, Surrey
Telephone: Woking 22111

Computer Operators

Letchworth & Stevenage

c. £5000

Our new Data Centre means 2900 development opportunities for you

1978 was another extremely successful year for ICL, turnover was up 22% to over £500 million, with over half the business coming from overseas.

This kind of success offers a tremendous challenge to the team who *provide a total DP service* to the major groups within ICL.

To cope with the Company's expanding needs we are opening a new Data Centre close to our existing centres at Letchworth and Stevenage.

We will be replacing our current 1900 processors – five 1904S's starting with two 2960's, a 2956 and EDS 200s, the operating system will initially be GEORGE III – DME and in the very near future VME/B.

This hardware will service the needs of nearly 200 remote users spread in the UK and overseas.

This development plan means that exciting *career opportunities* exist for experienced operators. Working for Europe's leading computer manufacturer you will receive first class company benefits including:

- Excellent salary – paid overtime
- Productivity Bonus Eligibility
- Comprehensive Training
- Good Promotion Prospects

Interested in a career with definite prospects? For Letchworth vacancies ring Mujib Sayed today on Letchworth (04626) 5461 ext. 159 or write to him at ICL House, Broadway, Letchworth, Herts SG6 1AG. For Stevenage vacancies ring Keith Bogg on Stevenage (0438) 56111 ext. 242 or write to him at ICL, Argyle Way, Stevenage, Herts SG1 2DD. When writing please quote reference CW 1142.

International Computers
think computers – think ICL

ICL

Gwent County Council

COUNTY TREASURER'S DEPARTMENT — COMPUTER SECTION

Gwent is a pleasant county in which to live. There is easy access to the motorways and the high speed rail systems. There are sporting and leisure facilities to suit all tastes from energetic pursuits such as sailing, to walking in pleasant countryside.
We have an IBM 370/148 with 3350 disk storage and take pride in being in the forefront of computer development. Plans have been made to replace the existing equipment. Decisions have been taken to extend the present on-line cash receipting and V.D.U. applications to take us into the 1980's.

Applications are invited for

SYSTEMS ANALYST/ PROGRAMMERS

on Grade SO 1/2 (£5,232 p.a. - £6,060 p.a.). These people will join existing teams dealing with a wide variety of applications. The main programming languages are PL1, Assembler and Fortran. Candidates should be suitably qualified and a minimum of five years computing experience is desirable.
Generous assistance will be given towards removal, legal expenses, etc.

Application forms available from the Personnel Officer, County Hall, Cwmbran, Gwent NP44 2XH should be submitted by Thursday, 19th April, 1979.

COMPUTER ENGINEERS
U.K. — O.S.

FIELD/SITE/SUPPORT/MANAGEMENT
ALL SYSTEMS GO
£5,000-£17,000

★ STAND BY
★ SHIFT
★ OVERTIME (According to post)
★ CAR OR ALLOWANCE

C. B. Stack Associates
RECRUITMENT CONSULTANTS. HODDESDON (09924) 42729

To P.D.P. 11-45

COMPUTER OPERATORS

are required to work in the City on a

NIGHT SHIFT

for 4 months minimum. Excellent pay and conditions.

Phone Anthony Hathaway on 01-353 8345, Manpower Ltd.

LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE
(University of London)

ADVANCED COURSE IN SYSTEMS ANALYSIS

1 year full-time Diploma Course in Systems Analysis and Design.
For people working in Data Processing and likely to go on to careers as project leaders and managers. The Diploma provides exemption from Part II of the British Computer Society examinations. Entry requirements are a relevant degree or professional qualification, e.g. B.C.S. Pt. I plus at least 3 years' experience. Fee: £2,500.

Applications for entry in October 1979 and requests for further information should be sent to the Secretary of the Graduate School, London School of Economics, Houghton Street, London WC2A 2AE as soon as possible.

COMPUTER ENGINEERS

On April 26th, 1979, a recruitment feature highlighting careers within the computer engineering field will be published.

To advertise in this important feature contact:

EDDIE FARRELL on 01-261 8097

Training in

CALIFORNIA

SALES EXECUTIVES c£16,000

Choice of 2 litre car — Basic c.£7,500 — Guarantees — Excellent benefits.

UNIQUE PRODUCT RANGE PRE/POST SALES SUPPORT c£8,000

Choice of car. Excellent fringe benefits

Our clients are the U.K. division of an extremely successful U.S.A. computer manufacturer. Their product is unique in that it can be operated from individual work stations in a 'multi-function' role. The company is a pioneer in distributed processing, in the true sense of the phrase, supported by powerful software enabling the product to be configured in any combination of the following:

★ Data Entry Systems
★ Programmable Display Systems
★ Stand-alone Multi-user Computer Systems
★ Distributed Processing Networks
★ Word Processing Systems
★ Programme Work Stations

The U.K. division has been remarkably successful in just two years, establishing an enviable reputation for technical excellence and product/client support.

We consider the potential of this company to be vast, and will undoubtedly offer candidates the opportunity of establishing superb career prospects in the short term. Income levels are amongst the best in the industry, and Fringe Benefits include:

★ Choice of Company Car
★ Private Patients Plan
★ 4 x Earning Life Insurance
★ Excellent Pension Scheme
★ Regular Training in California

Our clients requirements are as follows:

SALES EXECUTIVES

with a proven track record in the sales of any of the following:

★ Mini Computers
★ Distributed Processing
★ Word Processing
★ Communications
★ Intelligent Terminals

PRE/POST SALES SUPPORT

This exceptional career opportunity offers relevent candidates an exciting and varied career working closely with our clients, customers and the sales force. Candidates will find the work demanding, but very interesting; "JOB" satisfaction figures 'high up' on the list of benefits.

Applicants must understand IBM systems and terminology, especially teleprocessing. A knowledge of IBM assembler or Cobol would be an advantage.

In return a salary of c.£8,000 will be offered, plus a choice of company car, training in CALIFORNIA and the aforementioned benefits package.

For an informal and discreet discussion, please telephone the Advising Consultant, quoting reference no. DVW/79/7 (Sales Executives) DVW/79/8 /Pre/Post Sales Support).

INSIGHT MARKETING & PERSONNEL CONSULTANTS LTD.
72-75 MARYLEBONE HIGH STREET
LONDON W1M 3AJ. Tel: 486 5644

The Specialists in Computer Engineering Opportunities of ALL Disciplines.

HERTS AND NORTH LONDON

EDMONTON (1) Possibly the ideal installation — not too large, not too small, ICL 2904 based, informal, friendly, but very professional The vacancies are for 2 programmers (up to £5,000 p.a.) with at least 1 year's Cobol experience (any machine) to join a close knit department engaged in the development of both real-time and batch systems.

EDMONTON (2) Opportunity for a trainee or experienced operator (up to £4,000 p.a.) to join a two-shift (8 a.m.-1 p.m., 10 a.m.-7 p.m.) 5 day week mini installation controlling a number of local VDUs. No previous operating experience is necessary, but as there is just one operator per shift, a high degree of dependability is essential.

BARNET Opportunity to join the installation known for its first class working environment and progressive career structure IBM 370 based, the vacancies are for 2 Systems Analysts, not necessarily IBM (up to £6,500 p.a.), a senior programmer experienced in PL/I and assembler (up to £6,500 p.a.) and programmers with either PL/I (up to £5,750 p.a.) or 12 months' Cobol wishing to learn PL/I Extras include a non-contributory pension scheme raising the total remuneration package substantially above the basic salary.

POTTERS BAR Situated just North of Barnet an IBM 370-125 installation in the distribution industry has a vacancy for a Programmer/Analyst or Programmer with at least 1 year's Cobol experience (any Machine) wishing to learn analysis — the company will train as necessary. Salary (up to £5,500 p.a.), a variety of projects are offered using both main frame and a number of remote minis.

For more information ring:

HAYMARKET COMPUTING LTD.

Tel: Cuffley (Herts) 4130
up to 6.30 p.m.

COMPUTERVISION

US SERVICE MANAGER

£ NEGOTIABLE

Our current growth rate is around 100 per cent per annum — and we still maintain top quality support. Such expansion and promotions means we need an experienced service manager. This person will be cognisent of contract negotiation for customer maintenance, logistics and managing people. This is a hard top job and is rewarded accordingly.

SPARES AND REPAIRS ENGINEER

c. £7000

To support our team of top field engineers we need an engineer to control spares and inventory and repair selected items. This job includes customer liaison as receiver of calls for service and general queries on our hardware.

Full training will be given including some in the U.S.A.

Computervision Ltd. is the leading CAD/CAM Company in the U.K. Our policy is to make total support of our Turnkey Systems available to all customers.

Computervision supply top quality CAD/CAM Hardware, Software, training and support to some of the best known companies in Europe.

Why not become one of the UK's leading CAD/CAM support people and join our exciting, if a little mad, organisation.

For further details and an application form please contact:
Geoff Hall, Service Manager, Computervision Ltd., Computervision House, Penn Street, Nr. Amersham, Bucks. Tel: 0494 714771.

Easter Holiday

CLASSIFIED COPY

Advertisements for the following issues should be sent as early as possible.

April 12th

Bulk of copy by 4 p.m. Friday, 6th April; by 3 p.m., Monday, 9th April, latest.

April 19th

Bulk of copy by 4 p.m. Thursday, 12th April; latest by 11.30 a.m. Tuesday, 17th April.

Your help and co-operation will be very much appreciated, further details can be obtained from . . . David Abbey, 01-261 8016, Telex number 25137.

Young Programmers
a challenging career awaits you in
Management Consultancy
up to
£5750

City based
World wide travel

First Class training
Excellent prospects

The field of management consultancy offers the rare opportunity to gain exposure to varied problems and techniques on an international basis, while developing the skill in business practice essential for the step into company management.

Our clients are one of the world's foremost international management consultancies — part of a famous firm of chartered accountants, with some 350 offices in 90 countries, they have successfully undertaken many prestigious assignments in the UK and overseas developing systems using the most up-to-date data processing techniques covering a variety of applications for clients in Government, Industry and Commerce.

The Systems Development Group provides a DP consultancy service for the Company's clients throughout the world. As a programmer within the Group, you will gain experience on varied assignments involving:

The design, development and implementation of complex systems;

Computer policy planning, equipment selection and installation;

Feasibility studies and computer efficiency reviews;

DP organisational studies and procedures development.

Ideally you will possess a sound academic background (preferably degree level) and will have gained 1-3 years experience of commercial programming on mainframes or mini-computers. Strength of personality and communication ability will be important factors.

1979 Graduates Our clients also wish to appoint a number of graduate trainees later this year; you should be in the final year of a computer-related degree course and possess the strength of character needed to gain maximum benefit from intensive training and early responsibility.

Future prospects are excellent — assisted by the company's own in-depth training, and external courses, you will be expected to progress rapidly into senior DP consultancy positions, with opportunities to diversify into other fields of business.

If you are seeking a career path to the very top, contact Barry Latchford, quoting ref. BL 2018.

Lloyd Chapman Associates
123, New Bond Street London W1Y0HR 01-408 1670

Contract Spot

BASIC + 3-MONTH CONTRACT

Immed. start. Herts Consultancy W.1. & Bristol need contract & perm. staff.

Phone Paula on 01 946 4424
Meteor Computer Consultants Ltd.

ENGINEER

required.
2/3 years' experience, to maintain existing hardware and to interface new hardware. Able to liaise with software personnel. Salary circa £5/£6,000 p.a.

Contact: Mr. A. S. F. Turner
S.P.S.M.A. (UK) Limited
13 Hermitage Parade
Ascot, Berkshire
Tel: Ascot 21588

SYSTEMS PROGRAMMERS for COMMUNICATIONS DEVELOPMENT

Sia COMPUTER SERVICES

£6,500-£8,500

SIA provides a nationwide technical computing service based on linked CDC Cyber 175 and 6600 mainframes backed up by a strong consulting team. Currently over 200 batch and teletype terminals are supported through Modcomp front-end processors.

The operating systems for both the CDC machines and the Modcomp mini-computers are developed and supported by SIA's System Development Team which is located at the company's headquarters in Victoria. There is an on-going programme of system development and important new projects are scheduled for the immediate future, particularly the support of new network communications protocols and European datalinks.

If you are a systems programmer with experience in telecommunications, mini-computers or CDC operating systems and would like to know more about the opportunities offered by a career at SIA, please write or telephone:

MISS SUE KEMP, SIA LIMITED
23 LOWER BELGRAVE STREET
LONDON SW1W 0NW
01-7300 4544

Lorien ACROSS THE NORTH

STOP PRESS — LORIEN SERVICE now available CONTRACTS, NORTHWEST and NORTH EAST FAST

LEEDS £8000
SYSTEMS ANALYSTS
Commercial analysts with experience of at least one major system and some programming experience required for Leading Installation developing on-line systems

LEEDS to £5000
COBOL PROGRAMMERS
You should have at least 2 years COBOL experience, on any hardware, and a desire to work in a progressive installation with on-line program development.

LEEDS £8000
SENIOR ANALYST
A senior analyst capable of working on his/her own required by a progressive Central Leeds installation. Join a young, lively team.

LEEDS £6250
JUNIOR ANALYST
If you have a sound programming background and at least 12 months' analysis then our client can offer you experience and progression.

LEEDS to £5800
SENIOR PROGRAMMERS
Senior COBOL programmers required for expanding installation with new hardware. You will play a senior role in a team and have junior staff reporting to you.

LEEDS to £6000
RETAIL ANALYSTS
Numerous vacancies exist with several clients for personnel with good retail and/or warehouse system experience, either with or without a programming background.

NORTH YORKSHIRE to £7000
REAL-TIME
Clients in North Yorkshire are seeking technical staff with CORAL 66, RTL II or ALGOL based experience for a PROCESS CONTROL environment. POP-11 experience also widely sought.

WAKEFIELD to £6600
SYSTEMS ANALYSTS
Major Installations seeks additional commercial analysts with IBM hardware experience. You will work on major systems on modern hardware with on-line capability.

WAKEFIELD to £5000
PROGRAMMERS, ANALYST/ PROGRAMMERS
Several installations in the area seek additional COBOL based staff. These vacancies provide an opportunity to increase earnings and gain experience.

HULL to £5500
PROGRAMMERS
Vacancies exist for IBM COBOL, ICL COBOL and BASIC programmers in both in-house and software house environments. We are now able to help any programmer seeking a move.

HULL to £6000
SYSTEMS ANALYSTS
Commercial systems analysts may look forward to an exciting future in systems development with our major client. Good working conditions and attractive earnings.

HUDDERSFIELD c £5000
ANALYST/PROGRAMMER
Variety and professionalism are offered by this commercial installation. Plenty of challenge and scope for a lively and self-confident individual.

SHEFFIELD £5000 +
ANALYST/PROGRAMMERS
Large commercial station available for ICL COBOL based staff. In general salaries are high, prospects good and there is a wide variety of work available. Would suit person seeking more analysis experience.

LEEDS/SHEFFIELD £12K - £14K
SALES
We have a variety of sales positions including real-time minis, large mainframes and bureau services available. Earnings should not be less than £12,000 and often can be considerably more.

TEESSIDE to £7000
PROCESS CONTROL
Major use of real-time computer based process control systems seeks additional analysts and programmers experienced in CORAL 66, ALGOL or RTL II. Experience of minis or micros obviously essential.

NORTH EAST to £6000
Positions also available in the North East for commercial personnel at salaries up to £6000. We can now offer our personal service in this area too.

Phone Irene Rogers on Leeds 444185 (daytime) or on Wakefield 71810 (evenings and weekends) to find out more about the or any other positions East of the Pennines.

LIVERPOOL £4800 +
COMPUTER OPERATORS
If you have at least 2 years significant operations experience on major hardware regardless of manufacturer then our client has very challenging and attractive vacancies for you at a major site. In addition to extensive training and a clearly defined career path, a sizeable bonus scheme is in operation.

MERSEYSIDE £4400
JUNIOR OPERATORS
If you already have some useful computer operations experience and a good basic academic record our client can offer you a very attractive future in its rapidly expanding installation. You will be given every opportunity to develop in a highly professional environment.

MERSEYSIDE £5500
SENIOR OPERATORS
Wherever you are located our client will relocate you to work on one of the most exciting developments in the country. There is major new hardware, telecommunications, distributed hardware and database. You must have four years experience on large machines and be ready to meet the challenge and client criteria. Bonus scheme in operation.

MANCHESTER to £6000
SYSTEMS ANALYST
Our dynamic client requires experienced business systems analysts to work with clients on real-time systems development. Generous car allowance and a bonus is payable. You will work on real-time small business systems for a variety of companies

MANCHESTER to £6500
ENGINEER
Experienced field service engineers required by major real-time systems hardware manufacturer. Our client is expanding rapidly, therefore plenty of scope for personal advancement.

CHESHIRE to £6000
ANALYSTS
Highly reputable software house has urgent requirement for additional commercial analysts Range of hardware, including minis and mainframes. Real chance to gain experience and have variety of work and location.

NORTHWEST to £14000
SALES
Both mainframe and mini manufacturers have vacancies for hardware sales people working in the North West. A car is supplied with generous bonus schemes for success

LIVERPOOL ea/n £6000 plus
SYSTEMS ASSURANCE
An experienced project leader with strong personality is required to lead a new systems assurance section for a major company. Systems are large and advanced, involving the latest hardware and techniques. Full relocation and a bonus are payable.

LIVERPOOL to £6000 +
SYSTEMS ANALYSTS
Experienced commercial analysts of varying levels are required for major systems development. High salaries, bonus, excellent relocation are available for good people. Truly excellent prospects.

MANCHESTER to £6000
COBOL PROGRAMMERS
Numerous vacancies exist for commercial programmers with our major client in Manchester. The company is professional in its approach and will talk sensibly to you regardless of hardware.

CENTRAL LANCS. to £6000
ANALYSTS
Commercial user of modern hardware has requirement for additional analysts on major systems development. You have experience to date will not be a deciding factor — our client decides on ability.

Phone Steve Sykes on Leeds 444185 (daytime) reversing the charges if necessary, or on Leeds 662417 (evenings and weekends) to find out more about jobs West of the Pennines.

CONTRACTS CONTRACTS CONTRACTS

START NOW

LEEDS IBM OOS COBOL with CICs £250 p.w.
W. YORKS IBM COBOL DOS, OS to £245 p.w.
BRADFORD ICL PLAN to £190 p.w.
SAUDI ARABIA IBM Analyst Programmer £20,000 p.a.
HOLLAND ICL COBOL £300 + p.w.

For contract jobs ring LEN CRAY on Leeds 444185. We can help you find that new contract anywhere in the North now.

LORIEN COMPUTER SERVICES
Recruitment Consultants
OCS House, Servia Road, Leeds LS7 1NJ
Telephone 0532 444185
(24 hour Ansaphone service)

SYSTEMS DESIGNERS LIMITED

Quality first

Join the experts - explore the frontiers of computing technology

OPPORTUNITIES IN CAMBERLEY, FRIMLEY AND MANCHESTER

Systems Designers Limited frequently designs systems for hostile environments. That means putting computers to work on battlefields, in helicopters, and advanced combat aircraft, in steel mills and on ships at sea.

Successful completion of such projects has given us an unrivalled reputation, particularly in real time mini and micro applications, using the latest software techniques. It has also set us on an expansion path which promises professional software and systems engineers who join us now, a challenging and rewarding career throughout the 80's and beyond.

Systems Designers Limited is an independent British systems consultancy whose firmly established credibility and NEB backing ensure a confident and exciting future. Our staff, currently numbering some 200, share this confidence. They benefit from a company policy which offers maximum opportunities for rapid advancement through being involved with some of the most advanced computer systems in the world. Our continuing requirement is for Consultants, Engineers and Programmers, who should have a good academic background and at least one year's software experience, although we will be very interested in hearing from final year undergraduates.

Applicants should also be able to demonstrate a capability to work in new areas of mini and micro computer applications. We have a client base which covers UK, Europe, Middle East and USA, so there is a real opportunity to travel.

Our principal work areas are currently:

COMMUNICATIONS: Message switching, Telex systems, Communications management systems, computer communications.

INDUSTRIAL: Process control and monitoring, plant control simulation, high speed data analysis, distributed microprocessor systems.

MILITARY: Modelling, avionics and radar systems, complex rigs, simulators, microprocessor missile systems.

SOFTWARE PRODUCTS: Compiler technology, software design techniques, MASCOT, information processing systems, e.g. STATUS and Viewdata systems.

CONSULTANCY: Complex military systems, software and systems development technology.

All areas of involvement are supported by specialist consultants.

Systems Designers controls the career progression of its staff to give them a wide variety of experience, both of project applications and of computer systems.

Salary is negotiable up to £10,500 p.a. according to ability and experience.

The company runs productivity linked insurance and pension schemes and offers assistance with relocation if required.

Telephone Ann Gregory for an application form and further information about the company or write to:

Bill Hockey, Operations Director, Systems Designers Limited, Systems House, 1 Pinehow Broadway, Camberley, Surrey GU15 1BH
Telephone Camberley (0276) 63244

Manager or Team leader?

We are looking for some good Managers.

We know they will be expert at solving problems, pre-empting crises and handling exacting staff and customers.

We want them to STOP doing all those delightful things and concentrate instead on getting to grips with microprocessors.

At Marconi Avionics we are using microprocessors in all our projects: singly, in pairs, clusters, networks and, occasionally, in multitudes.

We will provide the training, but we are looking for some really expert problem solvers who can tackle a large number of one-man or two-man projects. Not who can just manage but who can really tackle, design and write code and work hands-on with our engineers to get the systems working.

To find out more about this challenging opportunity ring Ian Smith on 01-953 2030, ext. 3787.

Alternatively, please write to H. E. Batchelder, Marconi Avionics Limited, Elstree Way, Borehamwood, Herts. Please quote reference MA 79036.

These posts are open to both men and women.

MARCONI AVIONICS

A GEC-Marconi Electronics Company

Operations Team Leader (Day Shift)

ICL 2900/1900

London, E15 **£5450 +**

We have an ambitious development policy which commits us to providing database and increased communications facilities to all departments within the next five years. To help us achieve this a 2-megabyte 2960 running under VME/B will be delivered in June, 1979 to replace our present 1902T which runs under George 2S.

As an Operations Team Leader you will be responsible for both operational and control taks on a two-shift basis normally covering the hours 0800-1800, although this timespan may be extended for a limited period during transition to 2900.

Applicants should be at least 25 years old, with good experience of 1900 operating and the ability to supervise other staff. Some 2960/70 knowledge will be useful but is not essential as full training will be given.

We can't tell you much in an advertisement, but just telephone 01-278 6783 x 33 (around-the-clock service) and we will send you full details. Or if you prefer write to the Head of Computer Services, 91 The Grove, London E15 1EW.

NEWHAM

COMPUTER ENGINEERS

On April 26th, 1979, a recruitment feature highlighting careers within the computer engineering field will be published.

To advertise in this important feature contact:

EDDIE FARRELL on 01-261 8097

IMPERIAL COLLEGE LONDON

DEPARTMENT OF COMPUTING AND CONTROL

INDUSTRIAL AUTOMATION GROUP

The Industrial Automation Group has recently taken delivery of a large Interdata 8/32 Computer (with 128K word store, disc and magnetic tape) to be used for simulation and control design studies of large industrial systems. A

COMPUTER MANAGER

is required, able to ensure the system's smooth running, to liaise with the manufacturers on faults and to install system updates.

The successful applicant will have a good administrative ability is required, knowledge of Fortran. Computer operating experience is essential and good administrative ability is required. Salary will be in the range of £4,369-£7,006 including London allowance.

Applications to Dr. P. O. Spooner, Department of Computing and Control, Huxley Building, Imperial College, London SW7 2BZ, stating qualifications and details of experience by 26th April, 1979.

Product Sales Manager

Financial Management Systems

(UK and Holland)

An opportunity to advance into management with a market leader.

RTZ Computer Services is a young, fast expanding and forward thinking company, within the world famous Rio Tinto Zinc organisation, which has a comprehensive portfolio of advanced financial software products. The latest addition to the product range is the General Ledger and Financial Control System **G/L PLUS** developed by the McCormack and Dodge Corporation of Boston, Massachusetts, which is quickly establishing itself as the most powerful and comprehensive software available.

We are seeking a young aggressive sales executive, with a proven record of success in selling computer services and/or software products to senior financial management within large corporations and institutions, who is now ready to move into a management role.

The primary job functions will be responsibility for the marketing and sales of **G/L PLUS**, which will include building a sales team to rapidly take full advantage of the tremendous market potential of the system.

The job will be located in

Central London

Personal income will depend on the speed of business growth, but the successful applicant will be expected to earn.

£12,000+

A **Company Car** will be provided.

Please contact Caroline Connabeer or Alan Williams quoting reference RTZ 049.

SMR Sales and Marketing Recruiters Ltd,
Victory House,
99 Regent Street,
London W1R 7HB.
Telephone 01-734 9776

PLYMOUTH POLYTECHNIC

SCHOOL OF ARCHITECTURE

RESEARCH ASSISTANT COMPUTER APPLICATION TO ARCHITECTURAL EDUCATION

To utilize computer graphics in order to develop design proposals for architecture in rural settlement. Candidates should have a good degree in architecture or computer studies.

Research Assistants are normally required to register for a higher degree, although post doctoral applicants will be considered. Appointments are for a period of two years with a possibility of a third year. (fixed term contract).

Salary will be £3,192 postgraduates or £3,468 post doctoral (or equivalent) with annual increments of £138.

Application forms to be returned by **Friday, 27th April, 1979**, can be obtained with further particulars from the **Personnel Officer, Plymouth Polytechnic, Drake Circus, Plymouth PL4 8AA.**

WE'RE REALLY GOING PLACES!

ARE YOU?

PROGRAMMERS OPERATORS

VP Consultants 01-491 3266

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COMPUTER SYSTEMS MANAGER

Start up in Heavy Process Plant **South West Ireland**

We are engaged in one of the largest industrial enterprise developments in Ireland. The new plant will be operational in early 1982 and preparations for business data systems, stores inventory control, maintenance planning and administrative data logging must be initiated. The selected applicant will work closely with the top company management to advise on the computer systems development program, set up the computer department and establish the required systems.

Candidates will be at graduate level and of Irish origin. At least 8 years of relevant industrial experience with demonstrated management capability and expertise in the use of computer equipment and systems is required. Remuneration will include a salary of over £10,000 per annum with company car, pension scheme and relocation assistance.

Please send brief details or contact Valerie Quill (Telephone 01-78[illegible] Telex 30[illegible]) quoting reference [illegible].

AUGHINISH ALUMINA LIMITED
Canada House, 65 St. Stephen's Green, Dublin, 2

SALES EXECUTIVES you can bank on Honeywell

HONEYWELL INFORMATION SYSTEMS is a well established name in the world of international banking and finance. In the City of London a number of prestigious banks and financial institutions have chosen Honeywell Computers for the solution of their business problems.

Because of continued success with its application packages covering

General Accounting and Foreign Exchange

more Sales Executives are required in the City of London for the successful

Level 62 and Level 64 computers

which provide DATABASE MANAGEMENT, TRANSACTION PROCESSING, ENQUIRY PROCEDURES, COMMUNICATIONS NETWORKS AND ON-LINE PROGRAM DEVELOPMENT.

SALES EXECUTIVES have much to gain from working with Honeywell including the prestige of working for one of the top companies in the computer industry. We pay our salespeople generously, we train them thoroughly and continuously, we support them with enthusiastic competent technicians and experienced banking people and we provide them with real scope for creative selling.

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The City of London

We generally expect our sales executives to earn

In excess of £14,000 pa

as well as providing them with a COMPANY CAR and a variety of fringe benefits.

If you are already a successful sales executive with direct experience of selling banking, financial or related systems we would like to meet you, after all, HONEYWELL COULD BE JUST THE COMPANY YOUR C.V. NEEDS!

Please contact Alan Williams or Caroline Connabeer, quoting reference HCB 049.

SMR SALES & MARKETING RECRUITERS LTD.,
Victory House,
99 Regent Street, London W1R 7HB
Telephone 01-734 9776.

LANCHESTER POLYTECHNIC
Coventry

HEAD OF COMPUTER SCIENCE DEPARTMENT

£8643-£9603 p.a.

The post is tenable from the 1st September, 1979. The Department offers CNAA Sandwich Degrees and Honours Degrees in Computer Science, HND and HNC in Computer Studies and a number of Short Advanced Courses. The Department is active in research and consultancy. The Head must be of high academic standing, have demonstrated the ability to manage people and resources, have experience of teaching and course organisation and be able to develop research. Industrial experience would be an advantage.

Applications forms, to be returned by April 26th, and further particulars from: Miss J. Mocaire, Director's Office, Lanchester Polytechnic, Priory Street, Coventry CV1 5FB.

OENJON INTERNATIONAL

requires a

FORTRAN PROGRAMMER

for Survey Analysis applications.

Should have both mainframe and mini-computer experience. Some knowledge of assembly and interactive programming a help.

Salary negotiable according to experience.

Please contact Keith Hughes at Oenjon International, 11 Denmark Street, London, WC2 (Tel. 01-240 1668).

Institute of Basic Medical Sciences

(British Postgraduate Medical Federation and Royal College of Surgeons of England)

Applications are invited from Science graduates and/or other appropriately qualified persons for the post of

PROGRAMMER/ TERMINAL SUPERVISOR

for a PDP-11 Remote Job Entry Terminal which is being installed at the Institute, as part of the University of London's computer network.

Salary within the scale £3,663-£5,604 plus £502 p.a. London Weighting. (University of London Scale 10 — award pending)

Further details from the Secretary to whom completed applications should be made by 27th April, 1979.

**Institute of Basic Medical Sciences
Royal College of Surgeons of England
Lincoln's Inn Fields
London WC2A 3PN**

£4000 - £7000+ North + Midlands Analysts & Programmers 061-832-4184 (Transfer charges, if necessary). Sampson Staff

MULTI-ACCESS

On-Line programming of a commercial system on a mini.

Two freelance programmers needed to start work urgently using high level language, location W1.

Ring: Fleet (02514) [illegible].

SMR Sales & Marketing Recruiters Ltd
Victory House, 99 Regent Street, London W1R 7HB

Sales Executives

If you are seeking to advance your career rather than simply looking for another job then you need the objective guidance of an organisation which is totally conversant with all aspects of sales and marketing within the computer industry.

Although our activities are devoted to this area, we are not merely a recruitment organisation; we are the only company within the industry which also provides sales training, market research and product promotion.

We understand sales people because we have done the job ourselves for a total of over 45 man years, and we know where the best job opportunities are because we have access to all the significant computer companies.

So give us a call if you need help of any kind; we believe there is still room for altruism in business. Who knows, you might even get to speak with TRADER!

Telephone 01 734 9776

A Sales & Marketing Services Company
TRAINING, PROMOTION, RESEARCH, RECRUITMENT
LONDON & MIDLANDS

NEW ZEALAND LAND OF OPPORTUNITY

ANALYSTS & PROGRAMMERS

The Company is a leading manufacturer and supplier of industrial, commercial and farming equipment in New Zealand. Products range from automotive parts to the largest earth moving machinery. A diversified product range together with related service organisations make this company a leading force in the country's development.

The installation is an IBM 370/125 based in Christchurch with a network of 18 terminals throughout the country.

They have vacancies for the following:

**SYSTEMS ANALYST (Finance and Administration) — with experience in Financial, Payroll or Shares Computer systems.

**SYSTEMS ANALYST (Stock Systems) — with experience in Computer Stock Inventory Systems.

**ANALYST/PROGRAMMER — with experience in an IBM DOS/VS COBOL environment.

All positions require a minimum period of four years' data processing experience on IBM/370 computers, together with a professional approach to user departments and the ability and personality to work in a team environment.

Rewards and benefits include: Excellent commencing salaries based on ability and experience. Assistance with relocation expenses and accommodation upon arrival will be offered to the successful applicants.

Mr. Bob Jones, Managing Director of our New Zealand Associates, I.D.P.E. Personnel Services Limited will be visiting the U.K. for the purpose of interviewing prospective applicants during the last two weeks of April.

In the first instance, please telephone Chad Stolper of Prescot Computers at 01-242 2142 or, if you prefer, write to him at:

PRESCOT COMPUTERS LIMITED
[illegible] Square
London WC1A 2LP

Tel. 01-242 2142 Telex: 23110

THE SALES AND MARKETING BIT

Keeping records is a question of self-discipline

DURING the last few episodes of this column we have been discussing call reports, reminder lists and generally the disadvantages in relying on one's memory in the context of sales information. Now we deal with the most critical area of all: client/territory records.

A delayed or non-existent call report can create many problems in context of a single situation. The absence of ongoing comprehensive client records becomes exponentially disastrous.

Perhaps because of a congenital abhorrence of paperwork, most salesmen are badly organised when it comes to the maintenance of detailed records related to sales oriented activity.

A cursory review of the salesmen around you will reveal a variety of methods for retaining sales information.

Backs of envelopes, last year's diary, soggy-eyed over-written record cards, a large manilla envelope at the back of the filing cabinet, a waste-paper scrabble in the bottom left-hand drawer, a cardboard box in the car boot — you know the kind of thing.

How some salesmen within the computer industry have the effrontery to go out and sell business efficiency systems when they are so administratively inefficient themselves, is beyond me!

The salesman who is setting up his territory records for the first time, or perhaps revising his existing methods, might gain some benefit from my own experiences on this topic.

Territory records need to be up-to-date, accurate, detailed, flexible, accessible, comprehensible and legible. Consequently, the contribution which can be made by card-files for example, is by and large limited to the control of call frequency (filed in order of call sequence/location of frequency to promote regular calling).

In my experience the best territory records are standard file folders kept in alphabetical order by client. Inside the front cover is a standard summary which covers all basic data on the client concerned with a simple one line an entry record of the data of each call made on whom, about what, and the approximate date/topic of the next meeting.

Into this file are then placed copies of all call reports, letters referring to the client, proposals, and the client's own corporate and product literature.

With this kind of system all the salesman has to do when preparing to call on a customer and prospect alike is merely to remove the whole file from the cabinet and take it to the call (having, where appropriate, informed his secretary accordingly).

The standard summary of sales information I referred to can take any format, but should cater for the following information:

Basic Data — company name, address, telephone number, industry type, contacts (by name and job), potential applications, turnover, existing equipment/services by supplier, number of employees, (your) main competitors.

Record of Sales Calls (Single line entry per visit) — date of call, contact, what happened, action taken, aim of next call, date of next call, other remarks (eg lost/won sale).

The two most significant benefits which come from effective sales records are control and continuity. The salesman can be effective only if he is fully aware of all the factors involving the decision making process. Comprehensive details of all client/prospect situations is more than half of the battle.

These same records can provide continuity of sales activity by giving rapid understanding to new salesmen in circumstances of territorial reorganisation or the departure of sales personnel.

This kind of approach puts all the information in one place, and makes it accessible for reference by sales support people too. It also imposes no limitations in respect of the amount of data which can be included in each individual record.

The whole process of maintaining effective territory records is a question of personal discipline. It really is a burden and a struggle when you first start, but after a while it becomes so much like second nature that you wonder how on earth you could possibly survive without it.

Come the recession, maybe you won't.

TRADER

PRODUCT NOTE

Calculator

CASIO has constructed the FX-48 Math Card within the same dimensions as its LC78G Mini Card. The calculator incorporates 31 scientific functions including log, trig and exponential functions, factorials and handling statistical data to yield mean and standard deviations, while being no bigger than a credit card. Liquid crystal display has a capacity of eight digits, and two type G10 silver oxide batteries last some 600 hours of continuous operation. The price is £24.95.

Casio Electronics Co Ltd (CW), 28 Scrutton Street, London EC2A 4TY. Tel: 01-377 9087.

Puzzle Answer

(1) $107+249=356$

(2) $\frac{1}{15^2}+\frac{1}{20^2}=\frac{1}{12^2}$

SPRING AHEAD WITH EFFECTIA GRAVIS

SYSTEMS DEVELOPMENT VACANCIES

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Systems Analyst	£6000	Surrey Ref. M2991
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Analyst Programmer	£6000	Cambs Ref. L2920
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Programmer COBOL	c£5760 Travel Co	Herts Ref. B2945
Programmer OS COBOL	£6000 + car	Middx Ref. B2921
Analyst Programmer COBOL-CORAL	£7000	Leeds Ref. B2856
Senior Analyst O&M or PL1	£7500	Middx Ref. B2865
Systems Programmer BAL-ICL	c£6500	Staffs Ref. C3006
Programmer RPGII	c£6000 + Mort	City Ref. C3009
Systems Programmer Mini Software/Assembler	£6000	[illegible]
Programmer COBOL/ALGOL	c£7000	[illegible] Ref. C2951

CONTRACT VACANCIES URGENT

[illegible]

OPERATIONS VACANCIES

Operations Manager DOS/VS SHADOW/DL1	to £8,000	[illegible] Ref. B3[illegible]
Senior Operator DOS/VS POWER/VS	c £5,000	[illegible]
Shift Leader OS/VS1 JCL	to £5,700	Middx Ref. B2927
Shift Leader 1900/GII+	£5,500	West London Ref. L2953
Senior Operator 2900/DME	£5,000	Hampshire Ref. M2788
Senior Operator 2903/4	£5,000	Surrey Ref. L2994
Operator 1900/GII+	£4,500	West London Ref. M2952
Senior Operator System 3 Days only	c £4,100	Croydon Ref. B2917
Senior Operator System 3, 2 shifts	c £4,400	North London Ref. B2879
Senior Operator OS/VS1	c £5,000	Middx Ref. C2924
Senior Operator DOS/VS POWER/GRASP	c £5,000	Essex Ref. C2996
Shift Leader OS/VS	c £5,500	London Ref. B2946
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Datasolve International

Contract Vacancies

ICL 2900 VME/B Cobol
We have requirements for programmers, analysts and systems programmers for long and short term 2900 contracts in UK/Europe

PDP Basic Programmers — HOLLAND **c. £20,000 p.a.**
A large successful Chemical Company have immediate and future vacancies for Basic, Basic + 2 and Mumps people to work on a variety of different systems. Remuneration will be c. £20,000 p.a.

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We are seeking candidates with sound INTEL 8080 experience or similar background for forthcoming assignments over the next few months. First time contracts are welcome to apply.

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IBM OS COBOL + IMS — KENT
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DESIGNER **PDP**
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COMMUNICATIONS — LONDON
OVERSEAS
ICL 2900 VME/B
SYSTEMS PROGRAMMER — GERMANY
INTEL 8080
ASSEMBLER — GERMANY
PDP FORTRAN — HOLLAND
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IBM OS SYS. PROG. — DUBLIN

Call Richard Kaluzynski, Neil Williams or Suzy Gillam for details

IMS Experience?
Earn up to £12,500 p.a.

We have an increasing number of vacancies for programmers with experience of IMS. If you have these skills and would be available to start work at any time in the next three months, a call to Neil or Richard at once would be well worth while.

If you don't generally do contract work you may still find that we can offer you some interesting alternatives. And we're part of the BOC Group — big IMS users themselves.

Knight

All vacancies are open to both male and female applicants. Phone anytime, or for an application form leave your name and address with our answering service.

Knight Computer Services Ltd.,
14 Old Park Lane, London W1Y 4HL.

01-491 4706

ST. MARY'S HOSPITAL MEDICAL SCHOOL
(University of London)
Paddington, London W2 1PG

PROGRAMMER A

required in Academic Surgical Unit for collection and analysis of data from large scale surveys funded by CRC. Day to day management and development of a PDP11 mini computer system which can be lined to a programmable RJE terminal connected to the ULCC complex. Experience of mini computer operating systems and data management as well as familiarity with conventional survey analysis necessary. Salary £4884 + £249 to £6133, including London Allowance.
Further details from Mr. L. P. Fielding.

Application forms from The Secretary at above address to whom they should be returned as soon as possible. Please quote ref. P/LPF/CW.

UNIVERSITY OF GLASGOW

ICL 2903 COMPUTER OPERATOR

required for Finance Office. Experience of operating a similar system an advantage. Salary according to age and experience. Superannuation scheme.

Applications giving details of education, age and experience, should be addressed to The Finance Officer, University of Glasgow, Glasgow G12 8QQ.

SITUATION WANTED

On West Coast of America, for Systems Programmer with 4 years experience of OS/VS1, CICS, Assembler, IBM 370/158. Currently employed within insurance field. Please reply to: J. R. Patel, P.O. Box 42273, Fordsburg 2033, Johannesburg, South Africa.

MICROELECTRONICS AND THE FUTURE... DO YOU WANT TO KEEP YOUR OPTIONS OPEN?

Microelectronics, particularly microprocessors, have been described as today's fastest accelerating technology. In such a climate you can't afford to make a wrong career move. At ERA we'll give you the chance to expand your abilities, to stay a generalist, and work on projects that are not merely at the forefront of technology, but are spread across a wide band of application areas.
We have invested heavily, both in manpower and in equipment, and now have one of the top UK teams for independent consultancy, project management, development and evaluation of microprocessor technology. We operate worldwide and, as consultants appointed under the government's MAP scheme, we can offer a complete microprocessor based product design and development service.
The significance of microprocessors has still to be appreciated by industry and we foresee an increasing demand for our services in future. Current opportunities exist for suitably qualified and experienced men and women in the following areas:

Microprocessor Applications

We require staff for a variety of industrial and government contracts. In particular, two areas for which staff are sought are:

A. HIGH INTEGRITY COMPUTING
ERA is at present working on the development of a 1MHz serial bus for avionics systems. The project involves microprocessor hardware and software development, interfacing problems and the performance of the system in a high electromagnetic interference environment, in which ERA has considerable expertise.

B. POWER CONTROL
Opportunities are available to work on the development of a variety of ultra reliable power electronics systems making extensive use of digital electronics and microprocessor control.

Microprocessor Consultancy

To join a specialist team operating as MAP consultants to industry. These are multi-faceted roles giving the chance of involvement in consultancy for potential applications within industry, training; and for assisting companies with the development of microprocessor or minicomputer based products.
Within this field your particular specialisations will be developed and catered for — for example, lecturing abilities. In general, however, these positions will call for administrative capabilities and the ability to interact effectively at senior level with clients.

If you have several years experience of minicomputers or microprocessors and are keen to develop your skills in any of the above areas without being restricted by over specialisation then contact the Personnel Manager, Electrical Research Association Ltd., Cleeve Road, Leatherhead, Surrey KT22 7SA. Telephone Leatherhead 74933.

ERA